

**United States Department of the Interior  
Bureau of Land Management**

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**Asphalt Ridge Tar Sands Leasing  
Environmental Assessment  
DOI-BLM-UT-G010-2010-0199-EA**

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**December 2020**

**Location:**

T. 4 S., R 21 E., SLM, Utah, Sec. 31, SE $\frac{1}{4}$ ; T. 5 S., R. 21 E., SLM, Utah  
Sec. 4, SW $\frac{1}{4}$ SW $\frac{1}{4}$ ; Sec. 5, lot 5, SW $\frac{1}{2}$ NE $\frac{1}{4}$ ; Sec. 9, lots 1 and 2, W $\frac{1}{2}$ NW $\frac{1}{4}$ ,  
W $\frac{1}{2}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ SE $\frac{1}{4}$ ; Sec. 15, lots 1-8; Sec. 22, lots 1 and 2, S $\frac{1}{2}$ NE $\frac{1}{4}$ ; Sec. 23,  
lots 4 and 5, S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ ; Sec. 27, S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ; Sec. 34, all.

Containing approximately 2,123 acres

**Applicant/Address:**

Jones Lease Service,  
P.O. Box 753,  
Salt Lake City, Utah 84110

**BLM EA Cost Estimate**

The approximate cost for  
creation of the is EA is  
approximately: \$264,000.00

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**BLM**

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**Tar Sands Leasing EA  
ENVIRONMENTAL ASSESSMENT  
DOI-BLM-UT-G010-2010-0199-EA**

**CHAPTER 1  
INTRODUCTION AND NEED FOR THE PROPOSED ACTION**

**1.0 PURPOSE & NEED**

***1.1 Introduction***

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of offering for lease one tar sand parcel totaling 2,115.90 acres located in the Asphalt Ridge portion of the Asphalt Ridge-Whiterocks and Vicinity Designated Special Tar Sand Area (STSA) (herein known as the Asphalt Ridge STSA). The STSA was designated by the Secretary of the Interior Orders of November 20, 1980 and January 21, 1981. The Bureau of Land Management (BLM) received an Expression of Interest (EOI) on November 13, 2009 for six areas of public land or minerals on Asphalt Ridge. These areas have been combined into this analyzed parcel, which may be offered as a competitive lease. This tar sand parcel is intermingled with 16,241 acres of tar sand leases issued by the State of Utah School and Institutional Trust Lands Administration (SITLA) and adjacent to an existing tar sand mine and processing plant on private land.

This EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A FONSI statement, which accompanies a decision record, documents the reasons why implementation of the selected alternative would not result in “significant” environmental impacts (effects) beyond those disclosed in the 2012 Oil Shale Tar Sands Programmatic Environmental Impact Statement (2012 PEIS).

***1.2 Background***

The BLM regulates the development and reclamation activities of tar sands on federal leases under 43 CFR 3141.0-8(a)(2), which allows for a plan of operations, including a mining plan to be approved if the tar sands are going to be conventionally mined. In this case the tar sands development would most likely be conventionally mined and therefore a mining plan approval (including all reclamation requirements) would be required as part of 43 CFR 3592.1. The BLM will require a bond pursuant to 43 CFR 3504 prior to the commencement of surface disturbing activities. The Utah Division of Oil, Gas, and Mining (UDOGM) may also require a reclamation plan.

In accordance with Section 369(d)(1) of the Energy Policy Act of 2005 (the Act), Public Law 109-58 (H.R. 6), enacted August 8, 2005, the BLM prepared a PEIS for Oil Shale and Tar Sands.. ”

On March 22, 2013, the BLM approved the revised 2012 “Approved Resource Management Plan Amendments/Record of Decision for Oil Shale and Tar Sands Resources to Address Land Use Allocations in Colorado, Utah, and Wyoming and Final Programmatic Environmental Impact Statement” (Bureau of Land Management, 2013). The OSTs PEIS/ROD analyzed the potential effects of the pending Asphalt Ridge lease application for the purposes of informing land use allocation decision-making, however the decision whether or not lease the Asphalt Ridge area was deferred to site specific NEPA (page 2-73).

*The Asphalt Ridge tar sands lease application, shown in [OSTS PEIS] Figure 2.4.3-3, is located approximately 11 mi south of Vernal, and the expression of commercial leasing interest that forms its basis was submitted on November 16, 2009. This prospective lease is for a commercial tar sands project; however, as with oil shale, the technology to develop tar sands commercially for fluid minerals development is in its nascent stages. While Alternative 3 analyzes the potential effects of this pending lease application, which covers approximately 2,100 acres, for the purposes of informing land use allocation decision-making, the information and analysis in this PEIS is not considered to be the NEPA analysis sufficient to provide the basis for determining whether or not to issue that lease. The NEPA analysis associated with the decision whether or not to issue the Asphalt Ridge lease is under preparation in a separate process.*

This EA is the “separate process” referred to in the 2013 OSTs PEIS ROD.

### **1.3 Purpose of the Proposed Action**

The BLM’s purpose for the project is to consider leasing in a manner that provides for recovery of tar sands while protecting other resources values. Leasing would be done in a way that is consistent with state, local and tribal plans to the extent allowed under federal laws, regulations, policies, and plans.

### **1.4 Need for the Proposed Action**

The need of the proposed action is to consider leasing tar sand deposits within the Asphalt Ridge STSA in accordance with the 2008 Vernal Field Office (VFO) ROD and Approved Resource Management Plan (RMP) (Bureau of Land Management, 2008) as amended, and all other laws pertaining to mineral development. In Section 369 of the Energy Policy Act, also known as the “Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005, the United States Congress declared that oil shale and tar sands (and other unconventional fuels) are strategically important domestic energy resources that should be developed to reduce the Nation’s growing dependence on oil from politically and economically unstable foreign sources”. By leasing these deposits, the BLM is complying with the mandates of Congress and the Energy Policy Act of 2005.

### **1.5 BLM Decision to be Made**

The BLM Decision to be made is whether or not to issue the requested lease, in whole or in part, and if the lease is issued, which stipulations and notices should be attached to the lease.

## **1.6 Conformance with BLM Land Use Plan(s)**

### **1.6.1 Vernal Resource Management Plan:**

Bureau of Land Management, Vernal Field Office, Record of Decision and Approved Resource Management Plan. Date Approved October 2008. (Bureau of Land Management, 2008)

This EA is in conformance with the VFO ROD and Approved RMP, mineral decision MIN-15 (pg. 99), which states:

*MIN-15 Management decisions regarding combined hydrocarbon areas/special tar sand areas are deferred to the PEIS that is being prepared.*

Although management decisions for tar sands were deferred to the PEIS, the Vernal RMP does contain resource allocations for tar sands, analysis of the impacts, and requires site specific NEPA for leasing. In addition, the Biological Opinion included the effects of tar sands leasing in its conclusions. Therefore, this lease would be subject to the VFO ROD and Approved RMP and Biological Opinion, including the EIS **Appendix K** (Surface Stipulations to all Surface Disturbing Activities), and **Appendix L** (Utah's T&E and Special Status Species Lease Notices for Oil and Gas and BLM Committed Measures), which contain pertinent stipulations and lease notices. It is also consistent with RMP decisions and their corresponding goals and objectives related to the management of air quality, cultural resources, fish and wildlife, invasive weeds, migratory birds, soils, vegetation, and water quality.

Issuance of the lease would not directly result in any ground disturbing activities, so it would not conflict with Visual Resource Management decisions in the Vernal RMP. However, issuance of the lease conveys a right to develop subject to the lease terms and conditions. Development of the lease may conflict with the VRM Class III designation for the project area depending on site specific design of the mine (placement of high walls, etc.), which is not known at this time. The VRM Class III objective is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract the attention of the casual observer but should not dominate the view of the casual observer. Change should repeat the basic elements found in the predominant natural features of the characteristic landscape. From the key observation points of Highway 40 and the Bonanza Highway, viewers would be likely to perceive some level of visual impact from a mine, with impacts expected to be greater for resources within the foreground-middle ground distance, and lesser for those areas within the background distance. Beyond the background distance, the project might be visible but would likely occupy a very small visual angle and create low levels of visual contrast. If leased, future development's conformance with visual resource management classes would be determined through additional NEPA upon receipt of a Plan.

### **1.6.2 Oil Shale and Tar Sands Approved Land Use Plan Amendment:**

The Approved Land Use Plan Amendments/Record of Decision (ROD) for Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the Bureau of Land Management in Colorado, Utah, and Wyoming and Final Programmatic Environmental Impact Statement (OSTS PEIS/ROD). Date Approved March 2013. (Bureau of Land Management, 2013)

This EA is in conformance with the following tar sand decisions in the PEIS:



- *Commercial leasing of tar sands resources will require that additional NEPA analysis be conducted prior to lease issuance. Information collected as part of the lease application process will be incorporated into the NEPA analysis (OSTS PEIS ROD Page A-11).*
- *Approval of the project-specific plans of operation will require NEPA review to consider site-specific and project-specific factors. The NEPA review for the plan of operations may be incorporated into NEPA for the lease application if adequate operational data are provided by the applicant(s)<sup>1</sup> (OSTS PEIS ROD Page A-11).*
- *Designate the following amounts of land within the specified STSAs as available for application for leasing for commercial tar sands development in accordance with applicable Federal and State regulations and BLM policies: Asphalt Ridge STSA: 2,123 acres, which represents the acreage subject to the pending tar sands lease application (OSTS PEIS ROD Page A-12).*

In addition, **PEIS ROD Appendix B** proposes conservation measures for tar sands leasing and development (p. B-2). These conservation measures are provided for the information of the decision makers and the public, as a non-exhaustive and non-exclusive list of measures that might be considered for adoption, in consultation with USFWS, through future planning, leasing, and/or project-specific decision-making. Current BLM guidance on similar actions (e.g., fluid mineral leasing) requires that the stipulation that is least restrictive yet effectively accomplishes the resource objectives or resource uses for a given alternative shall be used, while compliance with the ESA is maintained. For the leasing stage, these conservation measures will be incorporated as appropriate through lease notices and stipulations. The lease notices and stipulations that are applied to the Asphalt Ridge project will be specified in the EA impact analysis and **Appendix E**.

### **1.6.3 Utah Greater Sage-Grouse Approved Resource Management Plan Amendment:**

The Utah Greater Sage-Grouse Approved Resource Management Plan Amendment and Record of Decision (UGSG ARMPA/ROD). Date Approved September 2015. (Bureau of Land Management, 2015)

The Vernal RMP was amended in September 2015 by the Utah Greater Sage Grouse Resource Management Plan Amendment (RMPA). The UGSG ARMPA/ROD clearly defers all tar sands leasing availability decisions to the OSTS PEIS/ROD (UGSG ARMPA page 2-237), and imposes conditions for development of leasable areas in GHMA:

*This planning initiative is not considering management approaches for the development of oil shale and tar sand resources for detailed analysis in this EIS. In April 2011, the BLM initiated a planning effort addressing these*

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<sup>1</sup> Given that there is no project-specific plan of operations, the decision to be made as a result of this EA is limited to the lease application only. Future plan of operations will require additional site specific NEPA. However, development assumptions for analysis purposes have been made to improve the Decision Maker's understanding of the impacts that may result under each alternative in this EA.

*resources in Colorado, Utah, and Wyoming, and the Approved Land Use Plan Amendments/Record of Decision for Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the Bureau of Land Management in Colorado, Utah, and Wyoming and Final Environmental Impact Statement (OSTS PEIS/ROD) was completed in March 2013. The OSTS ROD closed all mapped occupied GRSg habitat on BLM-administered lands in Utah to oil shale and tar sands leasing and development, with the exception of approximately 2,123 acres, which represents the acreage subject to the pending Asphalt Ridge tar sands lease application.*

*The Utah GRSg planning process does not present or analyze any alternatives for management of OSTS resources that were not already considered in the recently completed OSTS planning effort, which included consideration of both opening and closing GRSg habitat to future OSTS leasing. As explained in the OSTS ROD, because of the nascent character of the oil shale and tar sands technologies, a measured approach was taken to oil shale and tar sands leasing and development to ensure that commercial viability was proven and the environmental consequences of these technologies is known before any commitment is made to broad-scale development which may impact other resource values. Consistent with this approach, the OSTS ROD closed mapped occupied GRSg habitat in Utah with exception of the approximately 2123 acres represented in this lease.*

This amendment designates the project area as being within a BLM designated General Habitat Management Area (GHMA) for the greater sage grouse (GRSG). The area does not fall within a State of Utah designated Sage Grouse Management Area (SGMA); however, all of the leasing area does fall within Utah Division of Wildlife Resources (UDWR) designated brood-rearing portions fall within wintering habitat for GRSG. Four sections of the proposed lease areas (Sections 22, 23, 27, and 34) are located fully within or have portions of the section that intersect a 2-mile lek buffer, however this lek is considered historic as of spring 2020.

- All portions of the proposed lease are open to leasing subject to standard stipulations.

In GHMA, new development of fluid mineral leases could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5.

### ***1.7 Relationship to Statutes, Regulations, or Other Plans***

The Proposed Action and No Action alternatives are consistent with federal, state, and local laws, regulations, and plans, including those laws and regulations identified in **section 1.2** of this EA. As defined in NEPA, BLM requires an additional analysis of the site-specific environmental, social, and economic effects of particular development proposals in order to consider the project's impacts before the approval of its developmental plans.

There are no management plans for lands administered by Utah Trust Lands Administration; however, the State has leased adjacent acreage for tar sands development, so the BLM assumes that this proposal is in conformance with the management objectives of the State.

The County has identified the project area as being within the Uintah Basin Energy Zone. Therefore, leasing the parcel for tar sands development is in conformance with the County's management plan.

## ***1.8 Identification of Issues***

**Appendix A** (Interdisciplinary Team Checklist) identifies all resources considered during the preparation of this EA. **Appendix B** and **Appendix C** list all threatened, endangered, candidate, or special status animal and plant species present in the VFO area, and identify which species have the potential to occur in the project area. Those resources that were determined to be potentially impacted are listed below and carried forward for detailed analysis in this EA.

- Air Quality and Greenhouse Gases
- Cultural: Archaeological Resources
- Wildlife: Non-USFWS Designated,
- Wildlife: Migratory Birds (including raptors)
- Wildlife: Threatened, Endangered or Candidate Animal Species
- Soils
- Plants: Invasive and Noxious Weeds, Native Communities, and BLM Sensitive
- Visual Resources
- Water: Groundwater Quality, Surface Water Quality
- Special Designations – McCoy Flats Trail System

## ***1.9 Summary***

This chapter has presented the purpose and need of the proposed project, as well as the relevant issues, i.e., those elements of the human environment that could be affected by the implementation of the proposed project. In order to meet the purpose and need of the proposed project in a way that resolves these relevant issues, the BLM has considered and/or developed a range of action alternatives. These alternatives are presented in **Chapter 2**. The potential environmental impacts or consequences resulting from the implementation of each alternative considered in detail are analyzed in **Chapter 4** for each of the identified issues.

## 2.0 DESCRIPTION OF ALTERNATIVES

### 2.1 *Alternative A – Proposed Action*

The proposed action is to offer for lease a parcel comprised of six tracts totaling 2,035.90 acres located in the 26,402-acre Asphalt Ridge Special Tar Sand Area (STSA) (**Appendix D, Figure 1**) for future tar sands development in response to a public EOI. The action of leasing itself does not create any immediate impacts to the surface, but the tar sands lease would grant the right, consistent with the terms and conditions of the lease, to develop the lease, which would result in impacts on the ground.

If the federal lease is issued, a site-specific exploration/mining plan(s) of operation (43 CFR 3592.1) would be developed by the lessee, probably as an extension of the intermingled State and private operations. Upon receipt of the exploration/mining plan and prior to authorization of any surface disturbing actions on the lease, the BLM would address the site-specific impacts in the plan under a subsequent NEPA analysis. The exploration/mining plan approval would be subject to stipulations attached to the lease and any other conditions of approval consistent with lease rights that would be developed through the site-specific NEPA process. In addition, any activity would have to be authorized through the Utah Division of Oil, Gas, and Mining (UDOGM) permitting process. Any disturbance or activities on the federal lease would be fully bonded by the BLM. Since the federal lease EOI did not include a development plan, for purposes of analysis in this document the BLM has prepared a probable development scenario for analysis based on proposed or ongoing development occurring on the intermingled state and private leases.

*Probable Development Scenario:* Due to the topography of the project area, and the approximate 10° to 25° down-dip of the tar sands resource (see the Generalized Geologic Section in **Appendix D, Figures 2 and 3**) it is probable that two general phases of tar sand mining would occur.

*Phase One:* It is anticipated that phase one would be surface mining of the portion of the federal, state, and private tar sand horizon that is exposed on the east side of Asphalt Ridge. The surface mining techniques utilized could include removal and relocation of the overburden (waste rock), breaking of the rock using explosives or machinery, and then loaded to a processing plant. Surface mining would probably progress towards the west until operations met the escarpment of Asphalt Ridge. At this point, it is anticipated that further surface mining will not be economically feasible due to the increasing depth of non-tar sands material (overburden/waste rock) that will overlie the tar sands, and underground mining may be an option to further extract the tar sands. It is assumed that the existing processing facility on private property would be used to process the mined tar sands. However, if the successful bidder/lessee proposes new processing facilities, those facilities will be addressed in the site specific NEPA analysis associated with the mine plan. Based on surface expression of the resource and the configuration of existing operations and mine plans, it is roughly estimated that this phase of the project would encompass up to 540 acres on the east side of Asphalt Ridge.

*Phase Two:* It is anticipated that phase two of the project would involve the underground mining of the tar sands remaining in the federal, state, and private leases after surface mining reaches its maximum economic depth. The underground mining could use a variety of methods (i.e. room and pillar), but for purposes of this EA, it is reasonable to assume that the operator would utilize the previously mined area, or State, or private surface to begin underground mining operations, and would not disturb the BLM managed surface to the west of Asphalt Ridge. A drift or slope

could be driven from the surface into the tar sand layer directly underground from the previously mined area. An option that could be used in underground mining of the tar sands is room and pillar, where the voids left by removed tar sands form the rooms and the unmined tar sands or waste rock for the pillars. The strength of the tar sands and the confining rock layers and other geological parameters would determine the recovery of the tar sands. In-situ extraction of the tar sands is presently not feasible given the technical knowledge of oil-wetted tar sands.

Typical development-related activities likely to occur under this alternative include nighttime lighting, noise during construction and mining activities, increased traffic during construction and mining, and water use to facilitate mining activities (see **Appendix F**). Due to the lack of a mine plan at this stage, it is impossible to quantify these activities at this time. If a lease is issued, a mine plan would be submitted to the BLM prior to development and would be reviewed in subsequent NEPA to determine the extent of these impacts.

## ***2.2 Alternative B – No Action***

Under the No Action Alternative, the Federal lease application would be denied. As a result, no surface mining or underground mining on BLM-administered land/leases would occur. Therefore, surface disturbance would not occur on the six BLM-managed tracts.

## ***2.3 Alternatives Considered, but Eliminated from Further Analysis***

No other alternatives were considered for detailed analysis.

## 3.0 AFFECTED ENVIRONMENT

### 3.1 Resources/Issues Brought Forward for Analysis

The affected environment of the Proposed Action and No Action alternatives were considered and analyzed by an interdisciplinary team, as documented in the Interdisciplinary Team Analysis Record Checklist (**Appendix A**). The checklist indicates which resources of concern are present, would be affected by the action, and would require analysis in the EA, or are either not present in the project area or would not be affected to a degree that requires detailed analysis.

#### 3.1.1 Air Quality and Greenhouse Gases

##### 3.1.1.1 Air Quality

Information on air quality in the leasing area is contained in the 2020 BLM Utah Air Monitoring Report (AMR) (BLM 2020) to which this analysis incorporates by reference. This EA summarizes technical information related to air resources affected environment.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub> & PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants (Section 2.2.1, AMR). The NAAQS are protective of human health and the environment. Compliance with the NAAQS is typically demonstrated by monitoring for ground-level atmospheric air pollutant concentrations. Areas where pollutant concentrations are below the NAAQS are designated as attainment or unclassifiable, and air quality is generally considered to be good. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy. Portions of Duchesne and Uintah Counties below 6,250 ft elevation, including where lease parcels are located, have been designated as nonattainment for the 8-hour O<sub>3</sub> standard (BLM 2020).

Air pollutant concentrations are reported using design values. A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. Design values are used to designate and classify nonattainment areas, as well as to assess progress towards meeting the NAAQS. Design values that are representative for the airshed where parcels are located are provided in **Table 3**. It is assumed that counties without reported design values have good air quality and pollutant concentrations are below the NAAQS. The main pollutants of concern are O<sub>3</sub> and PM<sub>2.5</sub> as these are the pollutants with reported design values near or above the NAAQS.

**Table 3.1.1.1-1. 2016 to 2018 Criteria Pollutant Design Values**

Pollutant	Location	Averaging Time	Concentration	NAAQS
O <sub>3</sub>	Duchesne County	8-hour	0.077 ppm	0.070 ppm
O <sub>3</sub>	Uintah County	8-hour	0.088 ppm	0.070 ppm
NO <sub>2</sub>	Duchesne County	Annual	4 ppb	53 ppb
NO <sub>2</sub>	Duchesne County	1-hour	26 ppb	100 ppb
NO <sub>2</sub>	Uintah County	Annual	3 ppb	53 ppb

Pollutant	Location	Averaging Time	Concentration	NAAQS
NO <sub>2</sub>	Uintah County	1-hour	17 ppb	100 ppb
PM <sub>2.5</sub>	Duchesne County	Annual	6.3 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>
PM <sub>2.5</sub>	Duchesne County	24-hour	25 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>

Every three years the Utah Division of Air Quality (DAQ) compiles statewide emission inventories to assess the level of pollutants released into the air from various sources (UDAQ 2020). **Table 3.1.1.1-1** below lists the 2017 emissions inventory of CAP by source for counties within the airshed that lease parcels are located. Statewide emissions inventories are provided in the AMR (BLM 2020). In the airshed, oil and gas sources are the largest emitters of NO<sub>x</sub> and VOCs which are chemicals that can form O<sub>3</sub> in the presence of sunlight. Area sources, such as residential or commercial sources, tends to be the largest emitter of the other criteria air pollutants.

**Table 3.1.1.1-1. 2017 Criteria Air Pollutant Emissions (tpy.) by Source for the Vernal FO**

County	Source	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOCs	NH <sub>3</sub>
Duchesne	Area Sources	9,481.4	343.5	6,560.6	1,204.3	35.6	24,747.6	493.4
	Non-Road Mobile	839.2	82.7	7.1	6.8	0.3	84.4	0.1
	Oil and Gas	5,387.4	5,502.1	250.8	250.8	11.9	12,483.3	0.0
	On-Road Mobile	2,364.6	826.0	283.7	89.1	3.7	243.4	11.4
	Point Sources	198.0	1,250.8	81.7	42.5	4.5	491.7	1.8
	VOC Refueling						20.0	
	<b>County Total</b>	<b>18,270.6</b>	<b>8,005.2</b>	<b>7,183.9</b>	<b>1,593.5</b>	<b>56.0</b>	<b>38,070.3</b>	<b>506.7</b>
Uintah	Area Sources	11,300.0	392.7	6,686.2	1,203.3	27.2	39,059.8	477.6
	Non-Road Mobile	2,011.8	277.1	15.9	15.2	0.6	146.8	0.4
	Oil and Gas	5,726.8	6,266.6	207.7	207.7	14.2	53,451.4	0.0
	On-Road Mobile	3,094.2	1,013.3	403.6	122.1	4.9	319.2	14.3
	Point Sources	12.9	9.5	4.3	1.7	3.0	31.2	0.0
	VOC Refueling						25.0	
	<b>County Total</b>	<b>22,145.7</b>	<b>7,959.2</b>	<b>7,317.6</b>	<b>1,549.9</b>	<b>49.9</b>	<b>93,033.4</b>	<b>492.3</b>

Hazardous air pollutants (HAPs) are known or suspected to cause cancer or other serious health effects, or adverse environmental effects, so they are also regulated by the EPA. Examples of listed HAPs emitted by the oil and gas industry include benzene, toluene, ethyl benzene, mixed xylenes, formaldehyde, normal-hexane, acetaldehyde, and methanol. A list of HAP point source emissions by County is published by the Utah Division of Air Quality (UDAQ 2020). The 2017 HAPS emissions are listed for each field office where parcels are located in AMR (BLM 2020).

The parcels in this lease sale are located within Prevention of Significant Deterioration (PSD) Class II areas and are not near (within 50 km) Class I National Parks in Utah. The CAA PSD requirements give more stringent air quality and visibility protection to national parks and

national wilderness that are designated as Class I areas, but PSD does not prevent emission increases. Federal Land Managers are responsible for defining specific Air Quality Related Values (AQRVs), including visual air quality (haze), and acid (nitrogen and sulfur) deposition, for an area and for establishing the criteria to determine and adverse impact on the AQRVs. AQRVs do not have threshold standards, but Federal land managers have identified levels of concern. Current visibility and deposition information for regional Class I areas is summarized in the AMR (BLM 2020). Over a ten-year period (2009 to 2018), Visibility data in Utah show a statistically significant improving trend for the clearest days at all monitoring sites in Utah except at Capitol Reef National Park (trend not statistically significant). No statistically significant trend (improving or worsening) is observed at any of the IMPROVE sites in Utah for the haziest days. Nitrogen deposition conditions in Utah are fair to poor with no trend for improving or worsening conditions. Sulfur deposition conditions are good and generally improving.

### **3.1.1.2 Greenhouse Gas Emissions**

Climate is the composite of generally prevailing weather conditions, such as temperature and precipitation, of a particular region throughout the year, averaged over a series of years. Climate change is the long-term (several decades or longer) alteration of atmospheric weather patterns (temperature, precipitation, winds, etc.), but changes could also occur in other parts of the climate system such as the hydrosphere (water), cryosphere (ice), biosphere (living organisms, ecosystems), or lithosphere. While climate is always changing much of the recent observed changes are linked to rising levels of GHGs in the atmosphere (EPA 2016) due to human activities. The BLM Utah 2020 Air Resource Management Strategy Monitoring Report (AMR) (BLM 2020) discusses past, present, and foreseeable climate conditions and GHG emissions, and is incorporated by reference.

Each GHG has a global warming potential (GWP) that accounts for the intensity of each GHG's heat trapping effect and its longevity in the atmosphere. GWP values allow for a comparison of the impacts of emissions and reductions of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO<sub>2</sub>. The GHGs are presented using the unit of Metric Tons of CO<sub>2</sub> equivalent (MT CO<sub>2</sub>e), a metric to express the impact of each different GHG in terms of the amount of CO<sub>2</sub> making it possible to express GHGs as a single number. According to the Intergovernmental Panel on Climate Change (IPCC), GWPs typically have an uncertainty of  $\pm 35$  percent (IPCC 2014). GWPs have been developed for several GHGs over different time horizons including 20-year, 100 year, and 500 year. The choice of emission metric and time horizon depends on type of application and policy context; hence, no single metric is optimal for all policy goals. The 100-year GWP (GWP100) was adopted by the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol and is now used widely as the default metric. In addition, the EPA uses the 100 year time horizon in its *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018* (EPA 2020) and GHG Reporting Rule requirements under 40 CFR Part 98 Subpart A, and uses the GWPs and time horizon consistent with the IPCC Fifth Assessment Report (IPCC 2014), Climate Change Synthesis Report (2014) in its science communications. The BLM Utah uses 100-year GWPs from the IPCC AR5 that reflect the current state of science, except where stated otherwise. Table 7 lists the GWP values



from the IPCC AR5. Using the 100-year GWP values allows emissions estimates to be directly compared with state, national, and global emissions.

**Table 2.1.1.2-1. Greenhouse Gases and Their Global Warming Potentials**

Time Horizon	Carbon Dioxide (CO <sub>2</sub> )	Methane (CH <sub>4</sub> )	Nitrous Oxide (N <sub>2</sub> O)	Hydrofluorocarbons (HFCs)	Perfluorocarbons (PFCs)	Sulfur hexafluoride (SF <sub>6</sub> )
100-year	1	28	265	Up to 12,400	6,630-11,100	23,500
20-year	1	84	264	Up to 10,800	4,880-8,210	17,500

Source: IPCC AR5 (IPCC 2013)

State, national, and global annual GHG emissions are presented in Table 3-4. Global emissions were obtained from the World Resources Institute Climate Data Explorer (World Resource Institute 2019) and are reported up to the year 2016. National emissions for the 2018 reporting year come from the EPA Inventory of US Greenhouse Gases Emission and Sinks 1990-2018 (EPA 2020). Emissions for the state of Utah were obtained from the U.S. Energy Information Administration (EIA 2020) and supplemented by data from the World Resource Institute (agriculture, industrial sources, waste management, and fugitive emissions) and EPA (major industrial sources).

**Table 3.1.1.2-2 Annual State, National, and Global GHG Emissions (CO<sub>2</sub>e) in Million Metric Tons (MMT) per Year**

Utah	US Energy Sector	United States	Global
71.8	5,547.2	6,676.6	46,140.95

Sources: Global - World Resource Institute, CAIT Climate Data Explorer (World Resource Institute 2019)

United States - EPA Inventory of US Greenhouse Gases Emission and Sinks 1990-2017 (EPA 2020)

Utah – U.S. Energy Information Administration, EPA FLIGHT (EPA 2018) and World Resource Institute (World Resource Institute 2019)

The U.S. Geological Survey (USGS) has produced estimates of the GHG resulting from the extraction and end-use combustion of fossil fuels produced on Federal lands in the United States, as well as estimates of ecosystem carbon emissions and sequestration on those lands (USGS 2018). The study reports GHG emissions from extraction, transport, fugitives, and combustion of fossil fuels over a ten-year period (2005-2014). In 2014, nationwide gross GHG emissions from fossil fuels extracted from Federal lands was 1,332.1 MMT CO<sub>2</sub>e. Emissions from fossil fuels produced on Federal lands represent, on average, 23.7 percent of national emissions for CO<sub>2</sub>, 7.3 percent for CH<sub>4</sub>, and 1.5 percent for N<sub>2</sub>O over the 10 year evaluation period (USGS 2018). Uncertainty associated with emissions estimates is 2-5% for combustion, 25-42% for fugitives, and 12-15% for degassed CH<sub>4</sub> emissions from coal mines. Trends and relative magnitude of emissions are roughly parallel to production volumes. Utah Federal fossil-fuel-related gross emissions in 2014 were 46.75 MMT CO<sub>2</sub>e, approximately 3.5% of the estimate of national emissions from Federal fossil fuels (USGS 2018). Emissions from the adjacent fossil fuel producing states of Colorado, New Mexico, and Wyoming were 55.78, 91.63, and 744.2 MMT CO<sub>2</sub>e, respectively, in 2014. For comparison, Utah Federal emissions were 83.8% of Colorado's, 51.0% of New Mexico's, and 6.3% of Wyoming's.

Estimated annual GHG emissions from existing oil and gas wells are presented in Table 9. Single well emissions estimates are used from relevant oil and gas projects occurring in Utah to estimate the operation emissions from existing wells and construction emissions for new wells. See the AMR (BLM 2020) for details on single well emissions estimates. Construction emissions are based on the number of new wells drilled in 2019. New well operation emissions are not included since they are approximately offset by the decrease in emissions from wells that were plugged and abandoned in 2019. In 2019, there were 164 new wells drilled and 195 wells plugged. Existing oil and gas sources include active producing wells and shut-in wells that are capable of producing, as reported by the Utah Division of Oil Gas and Mining (UDOGM) at the end of 2019. Estimates of GHG emissions from combustion can be made by multiplying the produced number of barrels (bbl.) of oil and thousand cubic feet (mcf) of gas with GHG emission factors from the EPA Greenhouse Gases Equivalencies Calculator – Calculations and References website (EPA, 2019). These emission factors provide an estimate of the equivalent amount of CO<sub>2</sub> produced from a bbl. of oil or mcf of gas. The emission factors follow IPCC guidance by accounting for 100% oxidation of carbon in the fossil fuel to CO<sub>2</sub>, regardless of whether the carbon atom is part of a CO<sub>2</sub>, CH<sub>4</sub>, or another carbon-based molecule. Both Federal and non-federal wells are included in the emissions estimates. For context, Federal wells account for approximately 55% of all producing wells in Utah and Federal emissions likely account for a similar percentage of all oil and gas well emissions in the state.

**Table 3.1.1.2-3. 2019 Baseline Annual GHG Emissions (MT CO<sub>2</sub>e/yr.) from Existing Oil and Gas Wells.**

<b>Field Office</b>	<b>Number of Producing Wells</b>	<b>Operation Emissions</b>	<b>Combustion Emissions</b>	<b>New Well Construction Emissions</b>	<b>Annual O&amp;G Emissions</b>
<b>Vernal</b>	11,229	4,809,838	24,891,442	104,515	29,805,795
<b>Statewide Total</b>	13,835	7,673,701	30,680,164	121,105	38,474,969

EPA Emission factors: 0.43 metric tons CO<sub>2</sub>e/bbl., and 0.0551 metric tons CO<sub>2</sub>e/mcf. (EPA 2019)  
Production and well data obtained from the Utah Division of Oil Gas and Mining (UDOGM 2018).

Climate change is linked to the rising levels of GHG's in the atmosphere. Earth's atmosphere has a natural greenhouse effect wherein naturally occurring gases such as water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and fluorinated gases absorb and retain heat (EPA 2018). Several activities contribute to the phenomenon of climate change, including emissions of GHGs (especially CO<sub>2</sub> and methane) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). The National Oceanic and Atmospheric Administration's Earth Systems Research Laboratory tracks atmospheric concentrations of GHG, and data from the annual mean concentration and rate of change for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, see Table 10.

**Table 3.1.1.2-4. Global Atmospheric Concentration and Rate of Change of Greenhouse Gases**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<b>Pre-Industrial Concentration</b>	280 ppm	0.700 ppm	0.270 ppm
<b>2018 Atmospheric Concentration</b>	407.38 ppm	1.857 ppm	0.331 ppm
<b>2009-2018 Rate of Change</b>	2.29 ppm/yr.	0.007 ppm/yr.	0.010 ppm/yr.

**Source:** National Oceanic and Atmospheric Administration, Earth System Research Laboratory (NOAA/ESRL 2020), and EPA Inventory of US Greenhouse Gases Emission and Sinks 1990-2017 (EPA 2020)

The Annual Greenhouse Gas Index (AGGI) was developed to provide an easily understood standard for expressing the climate-warming influence of long-lived GHG's. Specifically, the AGGI is the ratio of the total direct climate forcing from measured GHG concentrations compared to the 1990 baseline year. Climate forcing, sometimes called radiative forcing, is the difference between the amount of solar energy absorbed by the earth and the amount of energy that is radiated back to space. The 1990 year is given an AGGI value of 1.0 and the pre-industrial era is given a value of 0.0 (NOAA/ESRL 2019). The AGGI for 2018 was 1.43, which represents a 43% increase to climate forcing since 1990. While the AGGI does not predict the amount the Earth's climate has warmed, it does provide a measure of the effect that GHG emissions have on the climate system.

The level of climate forcing can be assessed by evaluating historical climate conditions such as temperature and precipitation. In the United States, climate data is reported by geographic regions called "climate divisions". The seven climate divisions in Utah are organized based on areas with similar terrain and weather stations observing the same general climate conditions. All climate divisions in Utah have some general similarities such as winter having the highest amount of monthly precipitation. Average temperature and precipitation and trend information for each Utah climate division is compiled from the National Center for Environmental Information Climate at a Glance Website (NOAA/NCEI 2020) and is presented in **Table 3.1.1.2-5**. The averages for the most recent climate normal period (three-decade timeframe, 1981 to 2010) are also presented for comparison to the average of all data from 1895 to 2019. Temperatures have been increasing 0.2 to 0.3 °F per decade. The North Central and Western Utah climate divisions have shown an increase in annual precipitation, while the other Utah climate divisions show little to no substantial change to annual precipitation. Additional details on climate in Utah is available in the AMR (BLM 2020).

**Table 3.1.1.2-5. Current Climate Conditions and Trends in Utah**

Climate Division	1895-2019 Mean		1895-2019 Trend (change/decade)		1981-2010 Mean	
	Temp (°F)	Precip (in.)	Temp (°F)	Precip (in.)	Temp (°F)	Precip (in.)
<b>6, Uinta Basin</b>	45.2	10.76	+ 0.3	+0.01	46.4	11.23
<b>State of Utah</b>	47.8	13.46	+ 0.2	+0.03	48.7	14.05

November 2018, the Fourth National Climate Assessment (NCA4) Volume II was published. Compared to previous reports, NCA4 provides greater detail on regional scales as impacts and

adaptation tend to be realized at a more local level. The Southwest region (Arizona, California, Colorado, New Mexico, Nevada, and Utah) encompasses diverse ecosystems, cultures, and economies, reflecting a broad range of climate conditions, including the hottest and driest climate in the United States. The average annual temperature of the Southwest increased 1.6°F (0.9°C) between 1901 and 2016. Moreover, the region recorded more warm nights and fewer cold nights between 1990 and 2016, including an increase of 4.1°F (2.3°C) for the coldest day of the year. Each NCA has consistently identified drought, water shortages, and loss of ecosystem integrity as major challenges that the Southwest confronts under climate change. Since the last assessment, published field research has provided even stronger detection of hydrological drought, tree death, wildfire increases, sea level rise and warming, oxygen loss, and acidification of the ocean that have been statistically different from natural variation, with much of the attribution pointing to human-caused climate change (USGCRP 2018).

### **3.1.2 Cultural: Archaeological Resources**

A Class I cultural resource inventory and records review identified previously recorded cultural resource sites within the federal lease area. Known sites include lithic scatters, a Fremont habitation site, and prehistoric camp (O'Rourke, 2012). Based on the assessment of soils, elevation, topography, vegetation, and water resources in surveyed areas with similar conditions, the potential exists for finding additional cultural resources within the proposed project area. Additional cultural resources that could occur within the project area include sites from the Paleoindian Period (10,000 to 6,000 B.C.), the Archaic Period (6,000 B.C. to A.D. 500), the Formative Period (A.D. 500 to 1300), the Protohistoric Period (Shoshonean or Numic) (A.D. 1300 to 1850), and the Historic Period (A.D. 1850+).

Tribal consultations for the proposed project were initiated in May of 2011. Responses were received from the Pueblo of Laguna and the Hopi Tribe. The Pueblo of Laguna have determined that the undertaking will not have a significant impact on Traditional Cultural Properties (TCP) or religious sites. The Hopi Tribe has requested copies of future SHPO consultations regarding cultural resource inventories of the project area. Future consultation with Native American Tribes during individual development plans may or may not reveal concerns associated with TCPs. None are known to exist in the project area, however potential places of concern include religious sites associated with oral tradition and oral stories; traditional gathering areas; offering areas, including altars and shrines; vision quest and other individual use sites; group ceremonial sites, such as dance grounds; ancestral habitation sites; petroglyphs and pictographs; individual burials and massacre sites; observatories and calendar sites; and other geographic features. Further consultation with the Hopi Tribe will be needed for individual development plans should any sites be identified in the project area.

### **3.1.3 Wildlife: Non-USFWS Designated**

Several species occur within the parcel, such as small mammals, birds, raptors, and snakes. In general the parcel contains shrub steppe, semi-desert and desert vegetation types (salt-desert shrub vegetative community) of land that provide habitat for a variety of wildlife species including the black-tailed jackrabbit, cottontail rabbit, coyote, red fox, badger, striped skunk, and various species of amphibians and rodents. Although all of these species are essential members of wildlife ecosystems, most are common and have widespread distributions within the parcels including the surrounding region. Consequently, the relationship of most of these species within the parcels are not discussed in the same depth as species that are threatened, endangered, sensitive, of special

economic interest, or are otherwise of high public interest or unique value; however impacts to these species would be similar in nature to those of special status species. **Appendix B** lists the potential occurrence of BLM and Utah sensitive species within the analyzed parcels. The following species from **Appendix B** will be discussed below: golden eagle and raptors. Burrowing owl and white-tailed prairie dog are discussed in **section 3.1.6**.

### **3.1.3.1 Golden Eagle**

The golden eagle is protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668c), “based upon the similarity of the juvenile bald eagle’s physical appearance to that of the adult golden eagle, due to alarming population declines, and to preserve the species because of its value to agriculture in the control of rodents”. Four documented golden eagle nests are located within 0.5 mile of the proposed lease. Three of the nests are within the piece of the parcel located in Section 31 T4S, R21E. The Utah Division of Wildlife (UDWR) surveyed these nests in 2012 and found them to be active. The three nests are considered to be a part of a golden eagle nesting territory. All three of these nests are within 0.25 mile of an existing State tar sand lease, and within 0.5 mile of the existing mine and processing facility on private property. The nesting territory was resurveyed in 2016 and adult eagles were on one of the nest sites, with prominent whitewash on the second nest site. The fourth nest is located in Section 8 and is 0.37 mile away from the piece of the parcel in Section 9 T5S R21E, but within an existing state tar sands lease. Four additional nests are located greater than 1 mile away from the federal parcel and are completely within existing state tar sand leases.

### **3.1.3.2 Raptors**

Raptors, including the ferruginous hawk, red-tailed hawk, Cooper’s hawk, sharp-shinned hawk, American kestrel, northern harrier, and great horned owl, utilize each of the habitat types within the project area and may be present year-round or for certain times of the year. Nesting tends to be concentrated around cliffs, large trees, embankments, and other habitat features. GIS was reviewed and no nests are known to be in the project area.

### **3.1.4 Wildlife: Migratory Birds (including raptors)**

The Migratory Bird Treaty Act of 1918 protects migratory birds and their parts. Executive Order 13186, signed on January 10, 2001, directs federal agencies to evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern. Birds of Conservation Concern (Fish and Wildlife Service, 2008a) identify the migratory bird species of concern in different Bird Conservation Regions (BCRs) in the United States. The parcels are within BCR16 (Southern Rockies/Colorado Plateau). Species lists for BCR16 have been reviewed and the potential exists for several migratory bird species, currently designated as species of concern, to nest within the parcels, primarily between April and September.

The parcel contain mostly shrub steppe foraging habitat. Rocky outcrops and cliffs provide raptor nest habitat. All of these areas provide important habitat for migratory birds. Those migratory bird species that are BLM sensitive or are otherwise of special interest, including those species classified as High-Priority birds by Utah Partners in Flight (Parrish, 2002), that may occupy the proposed project area are addressed below. High-Priority species are denoted by an asterisk (\*).

Migratory bird species commonly associated with the sagebrush-steppe community within the project area include: the mountain bluebird\*, grasshopper sparrow\*, brewer’s sparrow\*, sage

sparrow\*, sage thrasher\*, green-tailed towhee\*, gray vireo\*, horned lark, juniper titmouse\*, pinion jay\*, gray flycatcher\*, loggerhead shrike, western kingbird, broad-tailed hummingbird\*, northern mockingbird, vesper sparrow, and western meadowlark (Parrish, 2002).

### **3.1.5 Big Game (Mule Deer)**

Mule deer are the primary big game species found within the project area. Based on BLM district files and Utah Division of Wildlife Resources (UDWR) GIS data, year-round crucial habitat is present within the project area, including summer fawning habitat and winter range habitat. The designation was made in the Vernal Field Office RMP (2008). Specifically, mule deer year-round crucial habitat is located along the east side of three parcels (section 31 T4S R21E and sections 5, 15, and 23 T5S R21E), and overlaps with veins in two parcels (section 31 T4S R21E and section 5 T5S R21E). Deer utilize the project area for foraging, thermal cover and escape cover. Mule deer have an extremely variable diet and consume a combination of grasses, forbs, and shrubs. Food consumption is also related to the season of use, and deer are reliant on shrubs for forage during critical winter months (UDWR 2014).

### **3.1.6 Wildlife: Threatened, Endangered, Candidate or Sensitive**

This EA's **Appendix B** identifies the potential occurrence of threatened, endangered, candidate and sensitive species within the project area, including species on the Utah BLM State Director's sensitive species list (Bureau of Land Management Utah State Office, 2011). The BLM manages sensitive species in accordance with BLM Manual 6840 with the objective to initiate proactive conservation measures that reduce or eliminate threats to these species to minimize the likelihood of and need for listing of these species under the ESA. Special status species are, collectively, the federally listed or proposed and Bureau sensitive species, which include both Federal candidate species and delisted species within 5 years of delisting.

#### **3.1.6.1 Greater Sage-grouse (BLM Sensitive Species)**

The Greater Sage Grouse (GRSG) populations have been on the decline for several years. Factors involved in the decline in both the distribution and abundance of GRSG include permanent loss, degradation, and fragmentation of sagebrush-steppe habitat throughout the western states including Utah (Braun, 1998). GRSG populations have declined (approximately 80%) from the mid 1960's to mid-1980's throughout much of the western states. Research and conservation efforts throughout the last twenty years have helped stabilize and recover many populations (Utah Division of Wildlife Resources, 2009). Populations have taken a positive turn in recent years (Western Association of Fish and Wildlife Agencies, Cheyenne, WY, 2015).

The BLM completed the Approved Land Use Plan Amendments/ROD for Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the Bureau of Land Management in Colorado, Utah, and Wyoming and Final EIS (OSTS PEIS/ROD) in March 2013 (Bureau of Land Management, 2013). The OSTS ROD closed all mapped occupied sage-grouse habitat on BLM-administered lands in Utah to oil shale and tar sands leasing and development, with the exception of approximately 2,123 acres, which represents the acreage subject to the pending Asphalt Ridge tar sands lease application (see page 2-237). The Utah Greater Sage-Grouse Land Use Plan

Amendment and ROD (Bureau of Land Management, 2015), released in September 2015, includes management to minimize and mitigate impacts on GRSG and its habitat

The proposed project area is located on the eastern edge of the Halfway Hollow subunit of the Uintah GRSG population area (Bureau of Land Management, 2015). As identified by the BLM the entire project area is located within a General Habitat Management Area (GHMA) for GRSG (**Map 3.1**). Seasonal habitat in this area is limited to sage-grouse brooding and winter habitat. Based on a review of the most recent Utah Division of Wildlife Resources (UDWR) lek data, there are approximately 216 adult GRSG in this population which is considered low in comparison to previous years (Maxfield, 2016). Approximately 1,617 acres of the project area is located within GRSG winter habitat and 2,123 acres within brood-rearing habitat. The nearest known lek to the project area is the Observatory Lek located approximately 0.25 mile west of the southern lease parcel (#9). The last time GRSG were observed in this area was in 2010. This lek is now considered an historic lek as of spring 2020, because GRSG have not been observed using the lek in 10 years.

**Figure 3.1.6.1-2. Map showing active GRSG lek in relation to lease parcel and BLM leasing categories.**

### **3.1.6.2 White-Tailed Prairie Dog**

The white-tailed prairie dog (*Cynomys leucurus*) (WTPD) is a Utah State Sensitive Species. Prairie dog colony surveys and burrow density estimates have not been completed within the surrounding areas; however, according to a field review it is determined that active prairie dog colonies are scattered throughout the parcel south of Highway 40 on BLM managed lands. One white-tailed prairie dog colony has been documented within 0.25 miles of one parcel and associated vein (sec 5 T5S R21E).

### **3.1.6.3 Burrowing Owl**

The burrowing owl is a Utah Wildlife Species of Concern. In Utah, prairie dog burrows are the most important source of burrowing owl nest sites. Burrowing owl use of abandoned prairie dog towns is minimal; however, active prairie dog towns are the primary habitat for the owls (Butts, 1969). As the range and abundance of these burrowing mammals have decreased, so too has the status of the burrowing owl. Potential nesting habitat exists within project area.

## **3.1.7 Soils**

Soils within the lease area are comprised of deep to moderately deep sandy loams, loams, and clay loams. These soils for the most part have been derived from sedimentary parent material and are typically formed in residuum from the parent material. These soils have a varying degree of water supplying and water holding capacities depending upon whether they are coarse- or fine-grained material and depending on depth to bedrock. Based on the Uintah Area Soil Survey, the susceptibility of the soil types in the project area to wind and water erosion ranges from moderate to high. The Uintah Area Soil Survey also indicates that the majority of the soils are nonsaline to very slightly saline. Only one soil type in the project area (soil map unit 97) is moderately saline. There are approximately 16 acres of this soil type that occur in the project area, and it is assumed that all 16 acres would be surface mined under phase 1 because they are located east of the ridge. Only one soil type in the project area (soil map unit 12) is strongly saline. There are approximately 122 acres of this soil type that occur in the project area, and it is assumed that all 122 acres would

be surface mined under phase 1 because they are located east of the ridge. Slopes in the lease area vary between 2 and 60% across the lease parcel (Natural Resources Conservation Service, 1997).

### **3.1.8 Plants: Invasive and Noxious Weeds, Native Communities, and BLM Sensitive**

#### **3.1.8.1 General Vegetation, Invasive/Noxious Weeds**

The following table, **Table 3-2**, provides the identified vegetation types present within the proposed lease sub-parcels where surface mining is likely to occur.

**Table 3.1.8.1. Percent of Project Area by Vegetation Type**

Vegetation	% of parcel to be surface mined
Badland/Rock Outcrop	12
Black Sagebrush	28
Desert Shrub	4
Pinyon Juniper/Sagebrush	47
Wyoming Big Sagebrush	9

Common species that may be found within these vegetation types include: black sagebrush (*Artemisia nova*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), mountain mahogany (*Cercocarpus montanus*), Mormon tea (*Ephedra* sp.), winterfat (*Krascheninnikovia lanata*), bud sagebrush (*Picrothamnus desertorum*), Indian rice grass (*Achnatherum hymenoides*) blue grama (*Bouteloua gracilis*), squirreltail (*Elymus elymoides*), needle and thread grass (*Hesperostipa comata*), salina wildrye (*Leymus salinus*), galleta grass (*Pleuraphis jamesii*), bluebunch wheatgrass (*Pseudoregneria spicata*), globemallow (*Sphaeralcea* sp.), and wild buckwheat (*Eriogonum* sp.).

Invasive plant species have established in the vicinity of the proposed project due to prior development, grazing, recreation, and encroachment from the urban interface. These species include halogeton (*Halogeton* sp.), cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola* sp.), and tamarisk (*Tamarix ramosissima*).

#### **3.1.8.2 Special Status Plant Species**

No federally listed threatened, endangered, proposed or candidate plant species occur within the project area or would be affected off-site by development of the lease. Potential impacts to special status plant species are discussed below.

##### **3.1.8.2.1 Hamilton Milkvetch (*Astragalus hamiltonii*)**

Hamilton's milkvetch is a Utah BLM sensitive plant endemic to the Uinta Basin in Uintah County Utah. This member of the bean family is a perennial herb, up to 23 inches tall, and produces white to cream colored flowers from late spring to early summer. Hamilton's milkvetch inhabits desert shrub and pinyon-juniper communities growing primarily on the Duchesne River formation.

A low intensity meandering survey was conducted through a portion of the proposed lease area that is expected to be disturbed due to surface mining. During this survey, no plants were identified. However, individuals are known to occur within 0.5 mile of the proposed lease area and given that



only a fraction of the potential habitat was visually inspected, it is possible that unidentified populations may be present within the lease area.

#### **3.1.8.2.2 Horshoe Milkvetch (*Astragalus equinsolensis*)**

Horseshoe milkvetch is a Utah BLM sensitive plant species (former candidate for federal listing) narrowly endemic to two known locations, one being the Horseshoe Bend area of the Green River in Uintah County, Utah, and the other being the rim above the Deloris River in Mesa County, Colorado. This member of the pea family is a small herbaceous perennial, producing 4 to 13 purplish pea-type flowers from April to May and later, hairy curled seed pods.

Horseshoe milkvetch grows in mixed desert and salt desert shrub communities and occurs on three types of substrate: 1) river terrace sands and gravels overlying the Duchesne River Formation; 2) sandy-silty soils that weather directly from the Duchesne River Formation; 3) and in crevices of Duchesne River Formation.

#### **3.1.8.2.3 Goodrich Beardtongue (*Penstemon goodrichii*)**

Goodrich beardtongue is a Utah BLM sensitive plant species, endemic to the Uinta Basin. This member of the plantain family (formally a member of the figwort family) is a small perennial herb arising from a branching caudex growing to a height of 40 centimeters. The species produces blue to blue-lavender flowers with violet guidelines in the throat.

Goodrich beardtongue grows in cobbly sand or clay badlands and hills associated with the Duchesne River Formation within the salt desert scrub or pinyon-juniper communities. The nearest known population of Goodrich beardtongue is located approximately six miles to the west of the nearest proposed lease parcel. However, potential un-surveyed habitat is present within the lease parcels.

#### **3.1.8.2.4 Sterile Yucca (*Yucca sterilis*)**

Sterile Yucca is a Utah BLM sensitive plant species, apparently endemic to the Uinta Basin. This member of the asparagus family (formally a member of the agave family) is perennial subshrub that arises from a deep-seated horizontal rhizome. The plant produces white flowers that are not known to produce viable seed. Known occurrences of the species are found growing in sandy soils. However, this species is new to the UT BLM sensitive plant species list and as such has not been extensively surveyed for nor is the range and exact habitat requirements fully understood. Therefore, at this time, any sandy soils within the proposed parcel are assumed to be potential habitat for the species.

### **3.1.9 Visual Resources**

The project area occurs within an area managed as a VRM Class III according to the Vernal RMP/ROD 2008. VRM Class III objectives state, “The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape” (Bureau of Land Management, 1986).

In November of 2011, a Visual Resource Inventory (VRI) was completed for the Vernal Field Office. The project area falls within scenic quality units 28 Vernal Valley and 29 Asphalt Ridge (Logan Simpson Design Inc, 2011). Both units have been identified by the VRI as having a scenic

quality of B, and as being Class III quality. The VRI rating sheet narrative explains that this unit's development includes dirt roads, 2-tracks, and little other development. The Vernal Valley unit rating was based on water (noted in the VRI as "Green River runs through the east portion of the unit"), color (noted in the VRI as "bright green agricultural fields add contrast"), and adjacent scenery (noted in the VRI as ("Asphalt Ridge, Split Mountain, Uinta Mountains"). The Asphalt Ridge unit rating was based on landform (noted in the VRI as "steep ridgeline, not exceptional"), vegetation (noted in the VRI as "some variety, mostly sage, pinion, and juniper"), color (noted in the VRI as "some color intensity with exposed rock and pinyon juniper vegetation"), and adjacent scenery (noted in the VRI as "views of the adjacent Uinta Mountains enhance quality"). The Green River, agricultural fields, Split Mountain, and Uinta Mountains are not in the project area.

The VRI placed the project area in the Vernal and Adjacent Areas Sensitivity Rating Unit with an overall rating of moderate sensitivity with an explanation of "some concern from local residents but area is moderately developed with urban and agricultural uses". The project area falls within the area VRI identified as being foreground-middle ground.

### **3.1.10 Water: Groundwater Quality, Surface Water Quality**

#### **3.1.9.10.1 Surface Water**

See the **2012 PEIS section 5.5** for a discussion of the general impacts expected to surface water from tar sands development. The project area is located within the Uinta Basin. Total water supply in the Basin is estimated to be 1.1 million acre-feet per year from precipitation, and 3.2 acre-feet per year from river inflow. Total water surface water usage is 649,600 acre-feet per year from irrigation (340,000), export to Utah Lake Basin (167,000), evaporation from reservoirs (124,000), municipal and industrial depletions (18,000), and export to Wyoming (600). Surface water supplies the majority of the water needs of Basin residents (Utah Division of Natural Resources, 2016).

The project area is on and below Asphalt Ridge, which is within the Lower Green River, Diamond Mountain Hydrologic Unit Code 8 (HUC8), the Lower Ashley Creek, Twelve Mile Wash HUC 10, and the Ashley Creek, Middle Twelve Mile Wash HUC 12 boundaries. This area has steep slopes, and a number of ephemeral drainages throughout the parcel. These drainages, although not free flowing, can transport large pulses of water and sediment during the high precipitation events typical of this High Desert ecosystem, where the total annual precipitation could happen in one strong event.

Although there are no perennial surface expressions of water are present in the parcel, surface expressions of water will be existent during high precipitation events, and if there is a high amount of snow during the winter months. The high snow levels can cause the ephemeral washes to flow for longer periods of time during spring runoff, which increases the length of time these ephemeral washes have to transport soils from this area into one of the main water bodies described above.

The Highline Canal runs parallel to the eastern boundary of the parcel. Any unused irrigation water in the Highline Canal drains into Rasmussen Hollow, an ephemeral drainage, which drains directly into the Green River. Highline Canal is east of the parcel by 0.25 mile or less and is downstream of the parcel. The Highline Canal is empty at times during the irrigation season (Best 2017). Water Loss from the Highline Canal is 40 to 50% due to seepage, vegetation, and evaporation (Best 2017). At its closest point, the parcel is more than 9 miles upstream of the Green River via Highline Canal and Rasmussen Hollow. This canal is being converted to a pipeline system.

The Ashley Upper Canal also runs parallel to the northern  $\frac{3}{4}$  of the eastern boundary of the parcel. The Highline Canal is between the Ashley Upper Canal and the parcel. The Ashley Upper Canal is located 0.5 mile or more east of the parcel. Due to watershed topography, which slopes toward the Canal, it is reasonable to assume that if the Highline Canal were to fail, the runoff would enter the Ashley Upper Canal. Any unused irrigation water in the Ashley Upper Canal drains into Mantle Gulch, an ephemeral drainage, which then drains into Ashley Creek. Water Loss from the Highline Canal is 40 to 50% due to seepage, vegetation, and evaporation (Best 2017). At its closest point, the parcel is more than 7 miles upstream of Ashley Creek via Ashley Upper Canal and Mantle Gulch.

Middle Ashley Creek is 303d impaired for TDS, but does not have a Total Maximum Daily Loads (TMDL) developed yet (Utah Division of Water Quality, 2016). Lower Ashley Creek is impaired for Selenium & TDS. It has a TMDL approved (Utah Division of Water Quality, 2006). Ashley Creek as a whole is listed on the Utah 2016 Integrated Report for not supporting the assigned beneficial uses with impaired parameters of selenium, total dissolved solids, and aluminum (Utah Division of Water Quality, 2016a). Ashley Creek drains into the Green River immediately downstream of Stewart Lake (United States Geological Survey, 2003), and fall within the auspices of the Colorado River Basin Salinity Control Program. Ashley Creek near Vernal has an average annual flow of 69,147 acre-feet (years of record 1915-2014 at Gauge 09266500) (Utah Division of Natural Resources, 2016). Other surface water sources in the vicinity include perennial streams with flow rates that, like that of Ashley Creek, vary in response to weather and location along the watercourse, as diversions may result in lower flow rates at downstream locations. These streams and flow rates are Dry Fork (15,000 to 26,000 ac-ft/yr.), Mosby/Deep Creek (no data available), and Whiterocks River (71,000 to 88,000 ac-ft/yr.) (Utah Division of Water Resources, 1999).

The Green River is the principal drainage in the Basin (Utah Division of Natural Resources, 2016). The Green River from Duchesne River confluence to the Utah-Wyoming border is listed on the Utah 2016 Integrated Report for not supporting the assigned beneficial uses with impaired parameters of selenium, total dissolved solids, and E. coli (Utah Division of Water Quality, 2016a). There is insufficient data on the Green River from the Price River confluence to the Duchesne River confluence to make a 303d impairment determination. The average annual water flow of the Green River out of the Basin (measured at the confluence with the Price River) is roughly 3.5 million acre-feet per year (Utah Division of Natural Resources, 2016).

Depths to restrictive features in this parcel have been identified as being between 20 to 40 inches. However, depth to bedrock could be less in areas where bedrock is exposed and more in the upper and lower slopes that collect more sediment, and where the bedrock features cause sinks that collect sediment. Since depth to the restrictive layer is shallow and since the soils in the area have generally low permeability, when seasonal fluctuations in precipitation occur surface runoff is assured. General sedimentation can occur during runoff events, which effects turbidity as well as water quality with potential spikes in salinity, downstream.

In section 31, T4S R21E of the parcel, slopes are typically 50 to 90 percent over most of the area, but lesser slopes do occur toward the bottom main drainage points. In sections 5, 4, 9, 15, 22, 23, 27, and 34 of T5S R21E of the parcel, steeper slopes and many more ephemeral washes exist.

### **3.1.9.10.2 Groundwater**

Groundwater occurs at varying depths throughout the Basin and generally flows to the north. Groundwater could occur at less than 25 feet below ground surface near rivers and at over 1,500

feet below ground surface within oil producing areas in the Basin. In addition, the groundwater salinity varies greatly across the Basin. Development of groundwater resources in the Uinta Basin has been limited, because 1) surface water sources have met the demands, 2) the consolidated aquifers properties preclude large-scale development, 3) the groundwater quality in parts of the Basin is unsuitable for use, and 4) the economics of drilling and pumping water from deep aquifers is prohibitive. Municipal use accounts for the largest portion of that development (10,290 acre-feet per year), followed by power production (7,000 acre-feet per year), mining (3,000 acre-feet per year), oil production (770 acre-feet per year). Total groundwater withdrawals in the Basin are approximately 21,260 acre-feet per year (Utah Division of Natural Resources, 2016).

Depth to groundwater on the parcel is not currently known. This information, as well as the current constituent content of the groundwater, would need to be established before a mining operation could be approved.

No sole source aquifers exist in the project area. Also, no drinking water source protection zones (DWSPZs) are present in the parcel area. However, Public Water Source Steinaker Lake State Park is 7 miles north and upstream of the parcel. There are also two other Public Water Sources, Dinosaur National Monument Split Mountain and Green River Campgrounds, 15 miles east of the parcel.

There are eight wells within five to six miles of the project area for which groundwater quality data has been sampled. The McLish Unit 3 is five miles west of the parcel, the 4 Federal 11-35, 2 (22-25) Horseshoe, 1 (24-34) Horseshoe, and 1 Rockwood Brown wells are five to six miles south of the parcel. MW-1, MW-2 and MW-3 are located north in T. 4 S., R. 21 E., Sec. 31 NE1/4 and are being monitored by the Utah Division of Oil, Gas and Mining and the Department of Environmental Quality. The reported total dissolved solids (TDS) in milligrams per liter (mg/L) for each well is as described in the following table.

**Table 3.1.10.2. Reported Total Dissolved Solids**

Well Name	TDS in mg/L
McLish Unit 3	4,746
4 Federal 11-35	2,913
2 (22-25) Horseshoe	7,843
1 (24-34) Horseshoe	4,251
1 Rockwood Brown	2,440
MW-1	5,033
MW-2	ND
MW-3	3,566

Keefer and McQuivey describe shallow groundwater in the Ashley Creek alluvial aquifer as the best source of water for pilot facilities in the vicinity of Asphalt Ridge and Whiterocks. This water is fresh to slightly saline. They also note that Ashley Creek, with a flow of 82,000 ac-ft/yr. near Vernal, could supply a production facility with water, assuming appropriate treatment of its high-salinity water. Bedrock aquifers northeast of Asphalt Ridge are also a possible source of water to support production. These aquifers are at depths of 4,000 to 6,000 ft and have fresh water (Keefer, 1979).

### **3.1.11 Special Designations – McCoy Flats Trail System**

A portion of the project area overlaps approximately 0.7 mile of the Jackalope mountain bike trail which is part of the McCoy Flats Trail System designated by Public Law 116-9, the March 12, 2019 John D. Dingell, Jr. Conservation, Management, and Recreation Act. The Act directs the BLM to prepare a management plan for the Trail System and provide for new mountain bike route and trail construction to increase recreational opportunities within the Trail System. BLM is currently preparing preliminary studies to determine the recreational use and distribution in the McCoy Flat area and believes that a land use plan will be necessary to create the McCoy Flats Trail System management plan. During the preparation of the plan, Congress has directed to manage the McCoy Flats trails in accordance with the Environmental Assessment for the McCoy Flats Trail System numbered DOI-BLM-G010-2012-0057 and dated October 2012.

## **4.0 ENVIRONMENTAL IMPACTS**

### **4.1 *Introduction***

This chapter describes the anticipated impacts that will occur to each resource under each alternative. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

### **4.2 *Alternative A – Proposed Action***

#### **4.2.1 Air Quality and Greenhouse Gases**

See the **2012 PEIS section 5.6** for a discussion of the general impacts expected to air quality and climate from tar sands development. The proposed action does not contain a plan of development, which prevents precise quantification of air quality and greenhouse gas emissions and impacts. The BLM has made several development assumptions which may be used to qualitatively estimate impacts, but emissions resulting from the proposed action remain unquantifiable. For the purposes of this EA, the BLM incorporates by reference the calculated emissions the UDAQ small source exemption permit for the Petroteq Oil Recovery, LLC - Oil Sands Processing Plant (DAQE-EN 159520001-18) as a similar action. Should the BLM issue the lease and receive a plan of development from the successful leasee, evaluation of actual emissions and air quality impacts will be evaluated at that time based on the proposed plan of development.

##### **4.2.1.1 Air Quality**

The act of leasing will not impact air quality in the region. However, should the parcel be leased, development of the lease could impact air quality conditions. It is not possible to estimate potential air quality impacts at the leasing stage due to the variation in methods used to mine and refine tar sands products which are unknown at the time of leasing. The amount of emissions cannot be extrapolated from Canadian tar sands operations because Canadian tar sands are water wetted, while U.S. tar sands are hydrocarbon wetted (Bureau of Land Management, 2008c). This means the Canadian tar sands have an aqueous layer between the sand and the bitumen, making separation easier (Bureau of Land Management, 2012a). As a result, mining, extraction, refinement, and transporting techniques for tar sands in Utah will be different than those used in Alberta, and by extension the emissions expected from each operation will be different.

As noted in the 2012 PEIS, it is not possible to predict site-specific air quality impacts until actual tar sands projects are proposed and designed, so this EA includes an emissions estimate from a pilot tar sands processing facility (UDAQ permit DAQE-EN 159520001-18) as a representative emissions inventory. Emissions are calculated for mining, material handling, rock crushing, heaters, storage tanks, flaring, and fugitives. Emissions from equipment include NO<sub>x</sub>, SO<sub>2</sub>, CO and HAPs. Fugitive dust would occur from vehicles on unpaved roads and construction. Processing, upgrading, and transport can result in NO<sub>x</sub>, CO, PM, VOC, and SO<sub>2</sub>. These emissions estimates are based on a facility that is capable of producing 1,000 bbl. of oil per day. For operations with higher production levels the emissions are assumed to scale linearly with production.

**Table 4.2.1.1. Emissions Estimate in Tons per Year for Different Productions Levels**

Pollutants	1000 bbl./day	2000 bbl./day	5000 bbl./day	10,000 bbl./day
PM <sub>10</sub>	1.87	3.74	9.35	18.70
PM <sub>2.5</sub>	0.30	0.60	1.50	3.00
NO <sub>x</sub>	3.85	7.7	19.25	38.50
CO	2.63	5.26	13.15	26.30
VOC	3.60	7.20	18.00	36.00
SO <sub>2</sub>	0.02	0.04	0.10	0.20
HAPs	0.003	0.006	0.01	0.03

Air pollutant emissions such as exhaust from mining vehicles, and stack emissions from the processing plants and upgraders can contribute to local air pollution. Exposed mine surfaces can release volatile organic compounds and dust, while contaminated tailings ponds can release pollutants as well through direct evaporation or activity of microorganisms. These emission would directly correlate to ozone issues discussed in the cumulative sections below. A scenario of 1000 bbl./day would be below permitting requirements and have negligible emissions. A scenario with higher production rates such as 10,000 bbl./day could trigger new source review permitting and an approval order may be necessary along with control requirements in the permit. However, even at these higher production rates, emissions are still below de minimus levels for a non-attainment area. Site-specific measures would be employed to avoid or minimize effects to local or regional air quality. These additional measures will be developed and implemented at the time of receipt and review of a site-specific plan of development in coordination with the Utah Department of Air Quality or other agencies with expertise or jurisdiction, as appropriate.

Although O<sub>3</sub> will not directly emitted by tar sand activities, the precursors to O<sub>3</sub> formation (VOC and NO<sub>x</sub>) would likely be emitted. The background value for ozone is above the NAAQS so that any additional emissions of O<sub>3</sub> precursors may result in the formation of O<sub>3</sub> and thereby contribute to the ongoing exceedances. The Clean Air Act general conformity rules provides a means for determining if the direct and indirect emissions resulting from a Federal action cause or contribute to new violations of the NAAQS, worsen existing violations of the NAAQS, or delay attainment of the NAAQS.

The Clean Air Acts General conformity rule mandates that the BLM evaluate reasonably foreseeable emissions that result from its actions in a nonattainment area to determine if they conform with the applicable regulatory agency implementation plans (40 CFR 93.153) and do not contribute to air quality degradation. While the act of leasing will not result in direct emissions within the Uinta Basin ozone nonattainment area it is highly likely that mining the lease parcels would create indirect emissions in the nonattainment area.

The General Conformity Rule divides the air conformity process into two distinct areas, applicability, and determination. Federal agencies must initially assess if an action is subject to the Conformity Rule (Applicability Analysis) and then if the action conforms to an applicable implementation plan (Conformity Determination). Guidance from Information Bulletin 2014-084 (BLM 2014) was used to perform an applicability analysis in order to determine if a conformity determination is needed for this lease.

The general conformity rules are not applicable to this lease sale because: 1) leasing does not directly authorize pollutant emitting activities, and no direct emissions would result, 2) indirect emissions are not reasonably foreseeable as defined in 40 CFR § 93.152 as it is unknown what design features or mitigation measures an operator will use, and 3) it is unknown what emissions sources would be included in an air quality permit and not subject to a general conformity review. The BLM has evaluated the proposed lease sale in accordance with the provisions of 40 CFR Part 93, Subpart B. Based on a review of 40 CFR § 93.153(c), BLM has determined that the requirement to perform a full conformity determination is not required for the proposed action for the following reasons:

- Under 40 § CFR 93.153(c)(2), a conformity determination is not required for actions “which would result in no emissions increase or an increase in emissions that is clearly de minimis.” Leasing does not authorize emissions generating activities, and therefore does not directly result in an emissions increase. Additionally, 40 § CFR 93.153(c)(3) lists Initial Outer Continental Shelf leasing as not having reasonably foreseeable emissions and onshore leasing is similar where lease sales “are made on a broad scale and are followed by exploration and development plans on a project level.” At the leasing stage the BLM does not have a development plan for lease parcels and has determined that indirect emissions are not reasonably foreseeable until the project level.
- A conformity determination is not required “where the emissions (direct or indirect) are not reasonably foreseeable.” 40 CFR § 93.153(c)(3). As defined in the CAA, “Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity determination is made; the location of such emissions is known and the emissions are quantifiable as described and documented by the Federal agency based on its own information and after reviewing any information presented to the Federal agency.” 40 CFR § 93.152 While this EA provides information for the factors that should be considered to determine a reasonable *estimate* of foreseeable emissions for the proposed lease parcels and overall for the region for purposes of NEPA indirect and cumulative impacts analysis, it does not have specific information about whether or how the specific parcel under consideration will be developed during the initial 10 year lease period, such that a more precise emissions inventory could be reasonably estimated and compared to the thresholds provided in 40 CFR § 93.153(b).
- Furthermore, 40 CFR § 93.153(d) provides, “[n]otwithstanding the other requirements of this subpart, a conformity determination is not required for:
  - The portion of an action that includes major or minor new or modified stationary sources that require a permit under the new source review (NSR) program (Section 110(a)(2)(c) and Section 173 of the [CAA]) or the prevention of significant deterioration program (title I, part C of the [CAA]).” 40 CFR



93.153(d)(1). It is uncertain at this time, but highly likely, that several project design features, for example storage vessels, stationary engines, and other equipment will require at least a minor new source review (permit) prior to constructing such facilities to implement any subsequent development proposals. Emissions from such permitted facilities would not be subject to the general conformity analysis provisions.

For all of these reasons, a conformity determination is not required for the sale of the leases under consideration. However, before the BLM can approve a plan of development for lease parcels, conformity must be demonstrated.

#### **4.2.1.2 Greenhouse Gas Emissions**

There would be no GHG emissions as a direct result of the Proposed Action, which is administrative in nature – i.e., issuance of leases for Federal mineral resources. Nevertheless, the BLM recognizes that GHG emissions are a potential effect of the subsequent development of any leases that are issued. Leasing activities may lead to development or extraction of the resource at some point in the future. These activities would consequently produce an increase in GHG emissions. The amount of emissions cannot be extrapolated from Canadian tar sands operations because Canadian tar sands are water wetted, while U.S. tar sands are hydrocarbon wetted (Bureau of Land Management, 2008c). This means the Canadian tar sands have an aqueous layer between the sand and the bitumen, making separation easier (Bureau of Land Management, 2012a). As a result, mining, extraction, refinement, and transporting techniques for tar sands in Utah will be different than those used in Alberta, and by extension the emissions expected from each operation will be different.

As noted in the 2012 PEIS, it is not possible to predict site-specific impacts until actual tar sands projects are proposed and designed, so this EA includes an emissions estimate from a pilot tar sands processing facility (UDAQ permit DAQE-EN 159520001-18) as a representative emissions inventory. The three most commonly emitted GHGs likely from development and production of tar sands sources are CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. GHG emissions would result from fossil fuel powered mining equipment operating at the site, refinement of the recovered product, and the eventual combustion of the end-products, such as fuels and lubricants.

The GHG emissions estimate from a pilot tar sands processing facility (UDAQ small source exemption permit DAQE-EN 159520001-18) is provided as an estimate for possible emissions that could occur from developing lease parcels. For production of 1,000 bbl. of oil per day the GHG emissions are estimated to be 3.6 short tons CO<sub>2</sub>e per year, or 3.3 MT CO<sub>2</sub>e per year. Similar to air pollutant emissions, the GHG emission associated with processing tar sand is scaled linearly for different levels of production: 2,000 bbl./day would result in 6.5 MT CO<sub>2</sub>e/yr., 5,000 bbl./day would result in 16.3 MT CO<sub>2</sub>e/yr., and 10,000 bb/day would result in 32.7 MT CO<sub>2</sub>e/yr. The BLM is unable to provide an estimate of GHG emissions from mining the tar sand as several factors needed to calculate emissions are unknown at the leasing stage. Emissions from mining the tar sands primarily occur from heavy equipment (dozers, loaders, excavators, haul trucks, etc.) tailpipe emissions and it is unknown how much equipment is needed to remove overburden and handle minerals, or the distances that material would be moved from the mining pit to storage piles and the processing facility. However, GHG emission from mining and processing minerals would make up a small fraction of the emissions resulting from the end-use of extracted oils.

Estimates of downstream GHG emissions from combustion can be made by multiplying the produced number of barrels of oil with emission factors (0.43 metric tons CO<sub>2</sub>e/bbl.) from the EPA Greenhouse Gases Equivalencies Calculator – Calculations and References website (EPA, 2019). This emission factor provides an estimate of the equivalent amount of CO<sub>2</sub> produced from a barrel of oil. The emission factors follow IPCC guidance by accounting for 100% oxidation of carbon in the fossil fuel to CO<sub>2</sub>, regardless of whether the carbon atom is part of a CO<sub>2</sub>, CH<sub>4</sub>, or another carbon-based molecule. Assuming the production facility operates 300 days per year the downstream GHG emissions from producing 1,000 bbl./day is 129,000 MT CO<sub>2</sub>e/yr., and from producing 10,000 bbl./day is 1,290,000 MT CO<sub>2</sub>e/yr. The total amount of oil that could be extracted from the lease parcels is estimated to be 46 million bbl. of oil which would result in a total emission of 19.8 MMT CO<sub>2</sub>e over the life of the lease. This estimate is extrapolated by scaling the total estimate of 900 million barrels of oil listed in the Asphalt Ridge White Rocks Vicinity Geologic Report and scaling it to the amount of acres leased. This estimate is likely to be high since the end use from some previous Asphalt Ridge tar sands operations have been non-combustive (e.g. road paving material, roofing shingles).

Site-specific measures would be employed to avoid or minimize greenhouse gas measures. These additional measures will be developed and implemented at the time of receipt and review of a site-specific plan of development in coordination with the Utah Department of Air Quality or other agencies with expertise or jurisdiction, as appropriate. Since climate impacts are a result of global aggregate GHG emissions, climate change impacts are discussed in the cumulative impacts section of this EA.

Mitigation: The following Lease Notice would minimize impacts to air quality.

## **AIR QUALITY ANALYSIS**

The lessee/operator is given notice that prior to project-specific approval, additional air quality analyses may be required to comply with the National Environmental Policy Act, Federal Land Policy Management Act, and/or other applicable laws and regulations. Analyses may include development of a project-specific emission inventory, dispersion modeling to assess air quality impacts, and identification of mitigation measures or controls to minimize air quality impacts from development activities. These analyses may result in the requirement for additional project-specific air quality control measures.

### **4.2.2 Cultural: Archaeological Resources**

See the **2012 PEIS section 5.10** for a discussion of the general impacts expected to cultural resources from tar sands development. Potential impacts to cultural resources from operations within the 540 acres of the parcel which are assumed to be disturbed by development may include damage or destruction, and increased potential for vandalism or theft due to increased human access.

- Complete site destruction could result from clearing of the project area, grading, excavating, and constructing facilities and associated infrastructure if cultural sites are located within the footprint of the project.
- Site degradation and/or destruction could result from the alteration of topography, alteration of hydrologic patterns, removal of soils, erosion of soils, runoff into and sedimentation of adjacent areas, and contaminate spills if sites are located on or near the project area. Degradation could occur within the project footprint and in areas downslope

or downstream. Erosion of soils could negatively impact sites downstream of the project area by eroding away materials and portions of the sites, while the accumulation of sediment could add a protective covering to the site. Contaminates may affect the ability to conduct analysis of material present and the ability to interpret site components.

- Increases in human access and subsequent disturbance (e.g. looting, vandalism, and trampling) of cultural resources could result from the establishment of corridors and facilities in otherwise inaccessible areas. Increased human use exposes cultural resources to a greater probability of impact.
- Visual degradation of settings associated with cultural resources could result from the presence of tar sands development and its associated land disturbances and facilities. Sites such as sacred sites and landscapes, historic trails, and historic landscapes for which visual integrity is a component of significance could be affected.

Specific impacts cannot be addressed until individual plans of development are received and a Class III cultural resource inventory is conducted on all proposed development areas. To ensure appropriate mitigation of potential impacts to cultural resources, consultations will be conducted with the Utah State Historic Preservation Office and the Hopi Tribe, as requested, for individual project plans and cultural resource inventories.

#### **4.2.2.1 Mitigation:**

The following Lease Notice would minimize impacts to cultural resources.

#### **NOTIFICATION & CONSULTATION REGARDING CULTURAL RESOURCES**

The lease area may now or hereafter be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), the Archaeological Resources Protections Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), other statutes and Executive Order 13007, and which may be of concern to Native American tribes, interested parties, and the State Historic Preservation Officer (SHPO). The BLM will not approve any ground disturbing activities as part of future lease operations until it completes applicable requirements of the National Historic Preservation Act (NHPA), including the completion of any required procedure for notification and consultation with appropriate tribe(s) and/or the SHPO. The BLM may require modifications to exploration and development proposals to further its conservation and management objectives on BLM-approved activities that are determined to affect or impact historic or cultural properties and/or resources.

#### **4.2.3 Wildlife: Non-USFWS Designated**

The issuance of a lease would not directly impact wildlife resources on the nominated parcels. However, Chapter 3 identifies species and habitats which could be potentially impacted through future actions on leased parcels. Potential impacts are described for each species below. Application of the appropriate species-specific lease notices would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development. Project-specific impacts would include the direct loss, alteration, and fragmentation of wildlife habitat through construction and mining. In addition, noise disturbances could displace wildlife species. See the **2012 PEIS section 5.8** for a discussion of the general impacts expected to wildlife from tar sands development. For the leasing stage, the **2012 PEIS Appendix B** Conservation

Measures (Bureau of Land Management, 2013) have been incorporated as appropriate to reduce or prevent impacts through lease notices and stipulations. At the site-specific stage, after receipt and during review of the plan of development, the **2012 PEIS Appendix B** Conservation Measures will be reviewed again for applicability to reduce and minimize impacts.

#### **4.2.3.1 Golden Eagle and Raptors**

Potential effects of the Proposed Action on golden eagles and raptors include displacement from foraging areas from human activity and noise, loss of 540 acres of habitat, and reduction of prey species through habitat loss, activity, and noise. Additional impacts include disturbance from human activity including harassment. It is assumed the proposed action would result in disturbances to breeding, nesting, and fledgling success of active golden eagles or raptors nests.

The one golden eagle nest in Section 31 T4S R21E would be greater than ½ mile away, and on the opposite side of the ridge, from any anticipated mine development. The active golden eagle nesting territory, which consists of the 3 nest sites in Section 31, are on the cliff above the area where the mine development is assumed to occur. Impacts to the nesting territory by the federal action would be reduced through adherence to the mitigation measures and lease notices listed below.

#### **4.2.3.2 Mitigation:**

The following Lease Notice would minimize impacts to raptors on the rest of the lease.

#### **SPECIAL STATUS SPECIES – RAPTORS**

Raptor management would be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (VFO Approved Resource Management Plan (RMP) and Record of Decision (ROD), Appendix A; October 2008), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses.

**Exception:** None

**Modification:** Criteria that would need to be met, prior to implementing modifications to the spatial and seasonal buffers in the "Raptor BMPs", would include the following:

1. Completion of a site-specific assessment by a wildlife biologist or other qualified individual. See example (Attachment 1 of the Raptor BMPs in Appendix A)
2. Written documentation by the BLM Field Office Wildlife Biologist, identifying the proposed modification and affirming that implementation of the proposed modification(s) would not affect nest success or the suitability of the site for future nesting. Modification of the "BMPs" would not be recommended if it is determined that adverse impacts to nesting raptors would occur or that the suitability of the site for future nesting would be compromised.
3. Development of a monitoring and mitigation strategy by a BLM biologist, or other raptor biologist. Impacts of authorized activities would be documented to determine if the modifications were implemented as described in the environmental documentation or Conditions of Approval and were adequate to protect the nest site. Should adverse impacts be identified during monitoring of an activity, BLM

would follow an appropriate course of action, which may include cessation or modification of activities that would avoid, minimize or mitigate the impact, or, with the approval of UDWR and the USFWS, BLM could allow the activity to continue while requiring monitoring to determine the full impact of the activity on the affected raptor nest. A monitoring report would be completed and forwarded to UDWR for incorporation into the Natural Heritage Program (NHP) raptor database.

**Waiver:** None

#### **4.2.4 Wildlife: Migratory Birds (including raptors)**

See the **2012 PEIS section 5.8** for a discussion of the general impacts expected to migratory birds from tar sands development. The issuance of a lease would not directly impact migratory birds on the parcel. However, the issuance of the lease does convey an expectation that construction and mining could occur. Chapter 3 identifies that migratory birds occur on all portions of the parcel and could be potentially impacted through future actions on lease. Project-specific impacts are assumed to include the direct loss, alteration, and fragmentation of 540 acres of habitat from construction and mining. In addition to the direct loss and fragmentation of habitat associated with the Proposed Action, noise disturbances from increased traffic levels could temporarily displace migratory birds. Adherence to the below lease notice would be adequate for the leasing stage to disclose the potential for restrictions on any future site-specific development plans to reduce impacts.

##### **4.2.5.1 Mitigation:**

The following Lease Notice would minimize impacts to migratory birds.

#### **MIGRATORY BIRDS**

The lessee/operator is given notice that surveys for nesting migratory birds may be required during migratory bird breeding season whenever surface disturbances and/or occupancy is proposed within priority habitats. Surveys should focus on identified priority bird species in Utah. Field surveys will be conducted as determined by the Authorized Officer of the Bureau of Land Management. Based on the result of the field survey, the Authorized Officer would determine appropriate buffers and timing limitations.

#### **4.2.5 Big Game (Mule Deer)**

The issuance of a lease would not directly impact mule deer on the parcel. However, the issuance of the lease does convey an expectation that construction and mining could occur. Chapter 3 identifies that mule deer occur on the east side of three parcels and could be potentially impacted through future actions on lease. Project-specific impacts are assumed to include the direct loss, alteration, and fragmentation of approximately 10 acres of habitat from construction and mining. In addition to the direct loss and fragmentation of habitat associated with the Proposed Action, noise disturbances from increased traffic levels could temporarily displace mule deer. Adherence to the below lease notice would be adequate for the leasing stage to disclose the potential for restrictions on any future site-specific development plans to reduce impacts.

#### **4.2.5.2 Mitigation:**

The following Lease Stipulations would minimize impacts to mule deer associated with winter range habitat.

#### **TIMING LIMITATION – CRUCIAL DEER AND ELK WINTER RANGE**

No surface disturbing activities in deer and elk crucial winter range from December 1 - April 30.

**Exception:** This restriction would not apply if and/or elk are not present, or if it is determined through analysis and coordination with UDWR that impacts could be mitigated. Factors to be considered would include snow depth, temperature, snow crusting, location of disturbance, forage quantity and quality, animal condition, and expected duration of disturbance.

**Modification:** The stipulation could be modified based on findings of collaborative monitoring and analysis. For example, the winter range configuration and time frames could be changed if current animal use patterns are determined to be inconsistent with the dates and boundaries established.

**Waiver:** This stipulation could be waived if it is determined through collaborative monitoring and analysis that the area is not crucial winter range or that timing restrictions are unnecessary.

#### **MULE DEER FAWNING HABITAT**

The lessee/operator is given notice that lands in this lease have been identified as containing crucial elk calving or deer fawning habitat. Exploration, drilling and other development activities may be restricted for up to 60 days. Modifications may be required in the Surface Use Plan of Operations including seasonal timing restrictions to protect the species and its habitat.

### **4.2.6 Wildlife: Threatened, Endangered, Candidate or Special Status**

See the **2012 PEIS section 5.8** for a discussion of the general impacts expected to wildlife from tar sands development. The issuance of a lease would not directly impact fish and wildlife resources on the nominated parcel. However, the issuance of a lease does convey an expectation that construction and mining could occur. Chapter 3 identifies species and habitats which could be potentially impacted through future actions on lease.

#### **4.2.5.1 Greater Sage-grouse**

Implementation of the Proposed Action would result in the following potential impacts to sage-grouse that may be within the project area: direct habitat loss due to vegetation removal within sagebrush communities, avoidance and displacement due to increased human activity and habitat fragmentation, and mortality resulting from vehicle collisions due to increased access and human presence in the area.

Direct habitat losses within the probable development scenario would encompass up to 540 acres of surface disturbance, though it is all anticipated to occur on the east side of the ridge. It is not anticipated that the rest of the lease would be subjected to surface disturbance as described in **section 2.1** of this EA. The impacts to GRS habitat would occur on the eastern-most edge of

the mapped occupied habitat, thus while some habitat would be lost, fragmentation of the habitat will be minimal. Various studies have determined that sage-grouse are affected by human activity and that hens will nest farther away from leks in areas where human disturbance has occurred, and that nesting initiation rates were also lower. In addition, it was also determined that male attendance at leks was lower when human activity occurred within two miles of a lek (Lyon, 2003).

The only lek in the area is located within 2 miles of two portions of the parcel (#'s 8 & 9), however as of spring 2020 this lek is considered historic because no GRSG have been observed using the lek for 10 years. It is anticipated that mining activities on these portions would occur below and on the east side of the ridge. However, sage grouse could potentially be affected by project-related activities during the strutting season by noise disturbance and ongoing habitat fragmentation. Additional impacts associated with seasonal habitats with implementation of the Proposed Action would include noise from with construction and vehicle traffic. Traffic disturbances of 1-12 vehicles per day during the breeding season may reduce nest-initiation rates and increase distances from leks during nest-site selection (Lyon, 2003). Project related noise (e.g., increased volumes or types of noise from construction, including changes in ambient tones or tonal noises) would affect sage-grouse during the period those activities take place. Sage-grouse that could be displaced by noise and other human activities are not considered temporary as these types of disturbances will be long-term through the life of the project and could lead to permanent loss of sage-grouse use if sage-grouse utilized this area.

Sage-grouse attendance at the known leks in the area has declined over the past several years; however, birds have been observed during the winter months just west of the project area. The relationship between sagebrush and sage-grouse is closest during the winter when birds switch from a diet of forbs and insects to mainly sagebrush (Connelly, 2004). Impacts to winter habitats could decrease the amount of time birds may be found in an area or permanently displace birds from the affected area. During winters with heavy snowfall and cold temperatures, birds could move into more rugged land as they search for sagebrush above the snow and for protection from high winds (Connelly, 2004). Habitat loss and fragmentation in winter habitats could affect sage-grouse wintering in the project area, which could lead to displacement of sage-grouse into less optimal habitats potentially causing a decline in the species winter survival.

The BLM initiated coordination with the sage-grouse lead in the Utah Public Lands Policy and Coordination Office on August 29, 2012 regarding impacts to sage-grouse. On September 19, 2012, a response was received from that office stating that this project is outside the State's current sage-grouse management areas, so no more than minor adverse impacts are expected. In addition, the BLM contacted the local UDWR via phone regarding impacts to sage-grouse. No additional mitigation measures were identified by UDWR at that time. In 2020, a secondary consultation with UDWR/PLPCO dated November 17, 2020 was initiated by the BLM due to the time elapsed from the initial consultation in 2012 until now. The consultation found that the Sage Grouse habitat in the area has not been regularly used in the last 10 years and the proposed mitigation is suitable to maintain the habitat in the area

The following table documents consideration of the Required Design Features from the UGSG ARMPA/ROD. Lease stipulation and notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary to avoid or minimize impacts which

may include seasonal restrictions, noise restrictions, tall structure restrictions, lek buffers, predation, and compensatory mitigation. At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to the sage-grouse due to surface mining.

**Table 4.2.5.1. Required Design Features (RDF's) for Solid Minerals (including locatable minerals) (Bureau of Land Management, 2015) (see page C-3).**

<b>RDF's</b>		<b>Proponents applicability to the RDF's</b>
<b>Roads</b>	Design roads to an appropriate standard no higher than necessary to accommodate their intended purposes.	Road designs are assumed to be built to minimum needed standards and are appropriate in accordance with proponent's needs. Project proposals will be reviewed and analyzed during site-specific NEPA.
	Close and rehabilitate duplicate roads	Green river reclamation guidelines will be followed, and a GRSG seed mix will be used. Project proposals will be reviewed and analyzed during site-specific NEPA.
	Coordinate road Construction and use among rights-of-way or special use authorization holders.	The project area encompasses areas where existing rights-of-ways occur and also is within close proximity to where special use authorizations occur. Project proposals will be reviewed and analyzed during site-specific NEPA.
	Construct road crossing at right angles to ephemeral drainages and stream crossings.	Project proposals will be reviewed and analyzed during site-specific NEPA.
	Establish speed limits on BLM system roads or design roads to be driven at slower speeds to reduce vehicle/wildlife collisions.	Road designs are assumed to be built to minimum needed standards and are appropriate in accordance with proponent's needs. Project proposals will be reviewed and analyzed during site-specific NEPA.
	Do not issue rights-of-way or special use authorization to counties on mining development roads, unless for temporary use consistent with all other terms and conditions including this document.	This is not reasonably foreseeable and not likely applicable.
	Use dust abatement practices on roads and pads.	Dust abatement practices will be analyzed and applied as appropriate when project proposals review occurs during site-specific NEPA.
<b>Operations</b>	Cluster disturbances associated with operations and facilities as closely as possible.	Project proposals will be reviewed and analyzed during site-specific NEPA.
	Develop a plan to reduce vehicular traffic frequency use through	Project proposals will be reviewed and analyzed during site-specific NEPA.



RDF's		Proponents applicability to the RDF's
	establishing trip restrictions or minimization through use of telemetry and remote well control, unless required for safety purposes.	
	Use directional and horizontal drilling to reduce surface disturbance.	The current proposal for surface disturbance is located on the fringe of GHMA away from where grouse have been found in the past. Project proposals will be reviewed and analyzed during site-specific NEPA.
	Restrict the construction of tall facilities and fences to minimum number and amount needed.	Project proposals will be reviewed and analyzed during site-specific NEPA.
	Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.	Project proposals will be reviewed and analyzed during site-specific NEPA.
	Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.	The project is likely to be required to include tall structures on site. However, when applicable the proponent will be required to incorporate the Avian Power Line Interaction Committee's (APLIC's) <i>Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006</i> . Project proposals will be reviewed and analyzed during site-specific NEPA.
	Control the spread and effects of non-native plant species.	As applicable, the proponent will be required to include practices in compliance with the Green River District Reclamation Guidelines.
	<ul style="list-style-type: none"> <li>Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile Virus.</li> </ul>	This is not reasonably foreseeable and not likely applicable; however, project proposals will be reviewed and analyzed during site-specific NEPA.
	Clean up refuse.	Clean-up of facilities will occur as appropriate for project proposals. Project proposals will be reviewed and analyzed during site-specific NEPA.
<b>Reclamation</b>	Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites. Address post reclamation management in reclamation plan such that goals and objectives are to improve or restore GRSG habitat needs.	As appropriate, the proponent will be required to include project proposal practices in compliance with the Green River District Reclamation Guidelines. In addition, as appropriate the proponent will be required to include a "Net Gain" impact to sage-grouse from project activities.

RDF's		Proponents applicability to the RDF's
		Project proposals will be reviewed and analyzed during site-specific NEPA.

#### 4.2.5.2 Burrowing Owl

Under the Proposed Action, surface-disturbing activities would result in the loss of 540 acres of burrowing owl habitat in the proposed project area. If breeding owls occur in the vicinity of construction activities between March 1 and August 31, the Proposed Action could result in disturbances to breeding, nesting, and fledgling success. Additional impacts could include displacement from foraging areas, reduction of prey species, and loss of habitat. Impacts on active burrowing owl nests would be limited or completely eliminated through adherence to the raptor mitigation measure in **section 4.2.3** listed above which would require a buffer and timing restriction around active nests. The below lease notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary reduce impacts. At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to the burrowing owl due to surface mining.

#### 4.2.5.3 White-Tailed Prairie Dog

Under the Proposed Action, surface-disturbing activities on the federal lease would result in the loss of approximately 2 acres of existing prairie dog habitat. Implementation of the Proposed Action could alter prairie dog habitat, making it less suitable for the establishment of colonies. As traffic volumes and/or project-related activities increase, adjacent habitats may be avoided due to human presence, noise, and the potential influx of invasive weeds. Weed invasions may lead to a decrease in the amount of native perennials and bare ground, thereby degrading habitat for prairie dogs by decreasing visibility, forage quality, and burrow development. Although prairie dogs are often found on or near roadways, prairie dog colonies are typically fragmented by road development or other permanent structures. The below lease notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary reduce impacts. At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to the white-tailed prairie dog due to surface mining.

#### 4.2.5.4 Mitigation:

The following Lease Stipulations and Notices would minimize impacts to sensitive wildlife species.

#### **TIMING LIMITATION – GREATER SAGE-GROUSE BROOD REARING AND NESTING**

No surface-disturbing activities within 2 miles of active Greater Sage-Grouse leks found outside of Priority Habitat Management Areas (PHMA) within brood rearing and nesting habitat from **March 1 - June 15**.

**Exception:** None

**Modification:** None

**Waiver:** None

## **GREATER SAGE-GROUSE – NET CONSERVATION GAIN**

In Priority and General Habitat Management Areas (PHMA and GHMA) all actions that result in habitat loss and degradation will require mitigation that provides a net conservation gain to the Greater Sage-Grouse (GRSG). Mitigation must account for any uncertainty associated with the effectiveness of the mitigation and will be achieved through avoiding, minimizing, and compensating for impacts. Mitigation will be conducted according to the mitigation framework found in Appendix F in the 2015 Utah Approved Management Plan Amendment.

## **GREATER SAGE-GROUSE – REQUIRED DESIGN FEATURES**

Apply the Required Design Features (RDF)\* in Appendix C of the Utah Approved Management Plan Amendment when leasing within Priority and General Habitat Management Areas (PHMA and GHMA).

\*RDFs may not be required if it is demonstrated through the NEPA analysis that the RDF associated project/activity is:

- Documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat.

Provide no additional protection to GRSG or its habitat.

## **GREATER SAGE-GROUSE - BUFFER**

In Priority and General Habitat Management Areas (PHMA and GHMA), the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B, Applying Lek-Buffer Distances, consistent with valid and existing rights and applicable law in authorizing management actions.

## **UTAH SENSITIVE SPECIES**

The lessee/operator is given notice that no surface use or otherwise disruptive activity would be allowed that would result in direct disturbance to populations or individual special status plant and animal species, including those listed on the BLM sensitive species list and the Utah sensitive species list. The lessee/operator is also given notice that lands in this parcel have been identified as containing potential habitat for species on the Utah Sensitive Species List. Modifications to the Surface Use Plan of Operations may be required in order to protect these resources from surface disturbing activities in accordance with Section 6 of the lease form terms, Endangered Species Act, Migratory Bird Treaty Act and 43 CFR 3101.1-2.

## **ENDANGERED SPECIES ACT STIPULATION**

The lease may now and hereafter contain plants, animals, and their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objectives to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modification to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or

result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligation under requirements of the Endangered Species Act as amended, 16 U. S. C. § 1531 et seq. including completion of any required procedure for conference or consultation.

#### **4.2.7 Soils**

The issuance of a lease would not directly impact the soils resource in the proposed parcels. However, future development on the lease including surface mining, right-of-way construction, and the construction of other infrastructure will result in direct damage to approximately 540 acres of soils, which could result in increased erosion and sediment yields. The proposed action could result in the disturbance of up to 16 acres of moderately saline soils and up to 122 acres of strongly saline soils. In addition, surface mining requires removal and stockpiling of overburden, source rock, and waste rock, creating a large source of sediment and salinity which are susceptible to wind erosion. Ongoing stabilization of waste piles would be required (Bureau of Land Management, 2012a), and best management practices to reduce or prevent water erosion would be implemented. See the **2012 PEIS section 5.3** for a more general discussion of tar sand development's impacts to soils and erosion rates.

At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to the soils resource due to surface mining.

#### **4.2.8 Plants: Invasive and Noxious Weeds, Native Communities, and BLM Sensitive**

##### **4.2.7.1 General Vegetation, Invasive/Noxious Weeds**

See the **2012 PEIS section 5.8** for a discussion of the general impacts expected to vegetation including special status species from tar sands development. The issuance of a lease would not directly impact the general vegetation in the parcel. Future development on the lease including surface mining and the construction of other infrastructure could result in direct damage of up to 540 acres of native vegetation. Surface disturbance would create favorable conditions for the germination and establishment of undesirable non-native plant species. A reclamation plan and weed plan would be required with any future plans of development to be in conformance with the program requirements, and would be developed in consideration of the Green River District Reclamation Guidelines (Bureau of Land Management, 2016) and Vernal Planning Area Invasive Weed Management Plan (Bureau of Land Management, 2017).

##### **4.2.7.2 Special Status Plant Species**

The issuance of a lease would not directly impact threatened, endangered, proposed, candidate or sensitive plant species on the parcel. Chapter 3 identifies species that could be impacted through future actions on lease, including Hamilton's milkvetch, Horseshoe milkvetch, Goodrich beardtongue, and sterile yucca. Beyond the potential loss or damage to individuals, these impacts include direct dispersed and indirect impacts including: the loss of up to 540 acres of suitable habitat for the species and its pollinators; increased competition for space, light, and nutrients with invasive and noxious weed species introduced and spread due to the Proposed Action; accidental spray or drift of herbicides used during invasive plant control; altered photosynthesis, respiration,

and transpiration due to increased fugitive dust resulting from the surface disturbance and project related traffic.

The below lease notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary reduce impacts. In accordance with the below lease notices, future surface disturbing activities that relate to this lease will require surveys for the identified species as well as any Threatened, Endangered, Proposed, Candidate, or Utah BLM Sensitive plant species that is identified to have potential habitat within the lease in the future. Based upon the findings of the surveys, avoidance and mitigation measures will be developed and analyzed as part of any future plan of development.

#### **4.2.7.3 Mitigation:**

The following Lease Stipulations and Notices would minimize impacts to vegetation including special status species.

#### **UTAH SENSITIVE SPECIES NOTICE**

The lessee/operator is given notice that no surface use or otherwise disruptive activity would be allowed that would result in direct disturbance to populations or individual special status plant and animal species, including those listed on the BLM sensitive species list and the Utah sensitive species list. The lessee/operator is also given notice that lands in this parcel have been identified as containing potential habitat for species on the Utah sensitive species list. Additional surveys may be required to identify sensitive species (plants and animals) with their habitats and the methods that will be required to protect the identified resources. All surveys must be done by a qualified individual approved by the BLM prior to the survey commencement. The Lessee may be required to modify the Plan of Operations (mining plan) in order to protect these resources from surface disturbing activities in accordance with Section 6 of the lease form terms, Endangered Species Act, Migratory Bird Treaty Act and 43 CFR 3101.1-2.

#### **SPECIAL STATUS PLANTS: NOT FEDERALLY LISTED**

The lessee/operator is given notice that lands in this lease have been identified as containing special status plants, not federally listed, and their habitats. Modifications to the Proposed Mine Plan may be required in order to protect the special status plants and/or habitat from surface disturbing activities in accordance with Section 6 of the lease form terms, Endangered Species Act, and 43 CFR 3101.1-2.

#### **ENDANGERED SPECIES ACT STIPULATION**

The lease may now and hereafter contain plants, animals, and their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objectives to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modification to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligation under requirements of the Endangered Species Act as amended, 16 U. S. C. § 1531 et seq. including completion of any required procedure for conference or consultation.

#### **4.2.9 Visual Resources**

See the **2012 PEIS section 5.9** for a discussion of the general impacts expected to visual resources from tar sands development. The issuance of a lease would not directly impact the visual resource value of the parcel. Future development on the lease including surface mining and the construction of other infrastructure could result in direct damage of up to 540 acres. Key observation points (KOPs) for the proposed action include Vernal City and Uintah county residences, Highway 40, and the Bonanza Highway. All of these key observation points are in the VRI Vernal and Adjacent Areas Sensitivity Rating Unit with an overall rating of moderate sensitivity due to local residential development (Logan Simpson Design Inc, 2011).

For the Vernal Valley Scenic Quality Rating Unit, the proposed action would result in changes in adjacent scenery, as some high walls could be developed as a result of development on the 540 acres east of Asphalt Ridge where a surface mine is likely to occur. For the Asphalt Ridge Scenic Quality Rating Unit, the proposed action would result in changes to landform, vegetation, and color from the high walls and surface disturbance on the 540 acres east of Asphalt Ridge where a surface mine is likely to occur.

From the KOPs of Highway 40 and the Bonanza Highway, viewers would be likely to perceive some level of visual impact from a commercial project on federal, state, or private leases, with impacts expected to be greater for resources within the foreground-middle ground distance, and lesser for those areas within the background distance. Potential impacts would be associated with construction equipment and activity, cleared project areas, and the type and visibility of individual project components such as high walls, processing facilities, utility ROWs, and others. The nature, magnitude, and extent of development-related impacts would depend on the project type, location, and design. Beyond the background distance, the project might be visible but would likely occupy a very small visual angle and create low levels of visual contrast. Impacts on visual resources would be minimized at the development stage through adherence to the lease notice listed below which would require an evaluation of the best way to preserve visual values prior to development approval.

The below lease notice is sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary reduce impacts. At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to visual resources due to surface mining.

**4.2.8.1 Mitigation:** The following Lease Stipulation and Notice would minimize impacts to visual resources.

#### **VRM CLASS III NOTICE**

The lessee/operator is given notice that visual values and proposed actions will be evaluated to determine appropriate mitigations and conformance with Visual Resource Management Class III objectives.

#### **4.2.10 Water: Groundwater Quality, Surface Water Quality**

##### **4.2.10.1 Surface Water**

The act of leasing would not affect surface water, but a 540-acre surface mining operation could adversely affect surface water. A future 540-acre mining operation's spent tar sands could be a source of salts, metals, and hydrocarbons. See the **2012 PEIS section 5.5** for a more detailed

discussion of tar sand development's: common impacts; ground disturbance impacts; water use impacts; discharge, waste handling, and contaminant sources impacts; alteration of hydrologic flow systems impacts; and water budget impacts (Bureau of Land Management, 2012a).

It has been well documented that the project area is subject to low precipitation and flood events. Ephemeral drainages and their sediment load can be altered by surface disturbance, which will then influence the area's erosion, deposition, and scouring rates, and can cause velocity changes during these flood events. Specific to this area, erosion of area soils could occur as disclosed in **section 4.2.5**. Once in Highline Canal, any sediments and associated contaminants would travel nine miles or more down Highline Canal and Rasmussen Hollow to reach the nearest perennial water, the Green River.

The below lease notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary reduce impacts. At the site-specific stage, upon receipt and review of a plan of development, the BLM would consider alternatives to minimize or eliminate impacts (such as surface water monitoring near spoils disposal areas, sediment retention structures, etc.). In addition, adherence to the erosion control stipulations and notices identified under **section 4.2.5** would reduce the potential for eroded sediment including selenium to be carried downstream or offsite.

#### **4.2.10.2 Ground Water**

The act of leasing would not affect ground water, but a 540-acre surface mining operation could adversely affect groundwater. Spent tar sands might be sources of salts, metals, and hydrocarbon contamination of groundwater (Bureau of Land Management, 2012a). See the 2012 PEIS section 4.5 for a more detailed discussion of tar sand development's: common impacts; ground disturbance impacts; water use impacts; discharge, waste handling, and contaminant sources impacts; alteration of hydrologic flow systems impacts; and water budget impacts. These sections disclose the general and common impacts to groundwater from tar sands operations, and the BLM has determined they are sufficient disclosure for the purposes of leasing.

The depth to groundwater is unknown in this area, and additional water quality baseline data would be required to identify the baseline condition, site specific impacts, monitoring requirements, response thresholds, and response measures should the lease be issued, and plan of operations be submitted.

The below lease notices are sufficient for the leasing stage to notify potential lessees that project restrictions may be necessary identify, reduce, or mitigate site specific impacts. At the site-specific stage, upon receipt and review of a plan of operations, the BLM also would utilize best management practices to minimize or eliminate impacts (such as using a liner in waste disposal ponds, groundwater monitoring near waste water ponds or disposal areas, laboratory analysis of wastewater before injection).

#### **4.2.10.3 Water Consumption**

A future 540-acre mining operation could consume varying amounts of surface or groundwater depending on the mining process (see **Appendix F**) and the water source(s) used. Water use assumed to be necessary for a surface mine with surface report or solvent extraction for a 20,000 bbl./day plant includes mining (25,000 bbl./day), retort (12,000 bbl./day), solvent extraction (107,000 bbl./day), and upgrading (386,000 bbl./day) (Bureau of Land Management, 2012a).

Water that would need to be fresh for mining is 3.5%, for retort is 100%, and for solvent extraction is 22% (Daniels, 1981). Water use assumptions for larger plants are reported in the **2012 PEIS Appendix B** and are incorporated by reference.

Keefer and McQuivey (1979) describe shallow groundwater in the Ashley Creek alluvial aquifer as the best source of water for pilot facilities in the vicinity of Asphalt Ridge and Whiterocks. This water is fresh to slightly saline. They also note that Ashley Creek, with a flow of 82,000 ac-ft/yr. near Vernal, could supply a production facility with water, assuming appropriate treatment of its high-salinity water (Keefer, 1979). Bedrock aquifers northeast of Asphalt Ridge are also a possible source of water to support production. These aquifers are at depths of 4,000 to 6,000 ft and have fresh water. Other surface water sources in the vicinity include perennial streams with flow rates that, like that of Ashley Creek, vary in response to weather and location along the watercourse, as diversions may result in lower flow rates at downstream locations. Any water obtained from surface water or groundwater sources would not only have to be transported (by pipeline or truck) some distance to a particular project site but might also have to ascend a significant vertical elevation (Bureau of Land Management, 2012a).

Overall, it appears that water might be available to support a 20,000-bbl/day plant using in situ technologies, although water rights might need to be purchased, suitable water quality would have to be confirmed, and the economics of transporting the water to the project area would need to be assessed. A 20,000-bbl/day plant using surface mining and surface processing technologies would use more than 6% of the annual average of Ashley Creek (Bureau of Land Management, 2012a).

#### **4.2.10.4 Mitigation:**

The following Lease Notice would minimize impacts to the Highline Canal.

##### **HIGHLINE CANAL**

The lessee/operator is given notice that lands in this lease have been identified as being in proximity to the Highline Canal. Modifications to the Proposed Mine Plan, including the implementation of Best Management Practices (BMPs), may be required in order to reduce erosion of sediment, selenium, and Total Dissolved Solids (TDS) into the canal.

The BMPs may include but are not limited to:

- Maintain uncultivated buffer strips along the canal.
- Control soil erosion from canal banks and uplands.
- Place rock barbs or revetment to deflect runoff flow away from canal banks.

The following Lease Stipulation would minimize impacts to water quality.

##### **WATER QUALITY BASELINE DATA**

Adequate base line data and water impact analysis shall be established prior to conducting any surface disturbing activity. In order to accomplish this, the lessee shall submit for review and approval by the AO, a plan to analyze ground and surface water interactions as part of any operations or exploration on the lease. The plan shall be submitted prior to or concurrent with a Mining or Exploration plan under 43 CFR 3592.1. The water plan may contain but is not limited to:



- A reasonable data acquisition area surrounding the project, to include watersheds.
- Documentation of existing geohydrology.
- Identification of seeps, springs, wells, ponds, and alluvial and bedrock aquifers including:
  - Location, size or discharge quantity, and water quality including Utah Division of Environmental Quality Standards, in addition to stable isotopes as necessary; and
  - Identification of the sites, number of samples, and frequency of sampling for each site (seep, spring, well aquifer) to be taken in order to establish the baseline.
- Identification of existing water right holders and potential impacts to those holders.
- Identification of water balance including tailings management.
- Analysis of potential tailings leachate and migration.
- Creation of a surface and groundwater monitoring plan for water resources throughout and surrounding the operation and other sites including tailings.
  - Identification of effects to seeps, springs, wells, ponds, and alluvial and bedrock aquifers
- Identification of sample frequency and constituents to be monitored (quantity and quality -including those listed above).
- Identification of analyte thresholds
- Identification of the action to be taken if the analytes exceed the threshold or baseline concentrations
  - Identification of how the data will be stored and analyzed over time (Charts, Graphs, Text)
- Creation of a water replacement or treatment plan if the threshold limits (regulatory or baseline) have been exceeded for a water source containing <10,000 mg/l Total Dissolved Solids (TDS) that has been impacted in either quality or quantity which are identified in the plan.
  - Determine water quality and quantity
  - Water replacement mitigation or treatment method.
  - Type of analysis that determined water contamination

#### **4.2.11 Special Designations – McCoy Flats Trail System**

The Jackalope trail is located in its entirety on the west side of Asphalt Ridge in Township 05 South Range 21 East Sections 27 and 34. Future tar sand development, if authorized, is anticipated to occur below the east side of Asphalt Ridge. The trail comes within about 0.25 to 0.5 mile of the surface expressions of the tar sands resource; but is approximately 300 feet above the anticipated development level. Due to the ridge top topography and elevation change between the trail and anticipated development, no impact is anticipated to recreationists on the trail.

##### **4.2.11.1 Mitigation**

The following Lease Notices would minimize impacts to the McCoy Flats Trail System.

#### **McCoy Flats Trail System**

The lessee/operator is given notice that lands in this lease have been identified as being in proximity to the McCoy Flats Trail System. Modifications to the Proposed Mine Plan, including the implementation of Best Management Practices (BMPs), may be required in order to reduce conflict with or danger to Trail System users.

### **4.3 *Alternative B – No Action***

#### **4.3.1 Air Quality and Greenhouse Gases**

Under the No Action alternative, the Federal lease would not be issued so no emissions would occur.

#### **4.3.2 Cultural: Archaeological Resources**

Under the No Action alternative, the Federal lease would not be issued, so cultural resources on federal lands would not be impacted.

#### **4.3.3 Wildlife: Non-USFWS Designated**

Under the No Action alternative, the Federal lease would not be issued, so impacts to raptors and golden eagles on federal lands would not occur.

#### **4.3.4 Wildlife: Migratory Birds (including raptors)**

Under the No Action alternative, the Federal lease would not be issued, so no direct impacts to migratory birds on federal surface would occur.

#### **4.3.5 Wildlife: Threatened, Endangered, Candidate or Sensitive**

Under the No Action alternative, the Federal lease would not be issued, so no direct impacts would occur to threatened, endangered, candidate, or sensitive status animal species on federal lands.

#### **4.3.6 Migratory Birds**

Under the No Action alternative, the Federal lease would not be issued, so no direct impacts to migratory birds on federal surface would occur.

#### **4.3.7 Soils**

The No Action alternative would not result in potential impacts to soils on BLM managed surface.

#### **4.3.8 Plants: Invasive and Noxious Weeds, Native Communities, and BLM Sensitive**

The No Action alternative would not result in potential impacts to vegetation or special status plant species for BLM managed lands relating since no changes would be realized under this alternative.

#### **4.3.9 Visual Resources**

The No Action alternative would not result in potential impacts for visual resources on BLM managed lands since no changes would be realized under this alternative.

#### **4.3.10 Water: Groundwater Quality, Surface Water Quality**

Under the No Action alternative, the Federal lease would not be issued, so no impacts to water resources would occur on federal lands in the project area.

#### **4.3.11 Special Designations – McCoy Flats Trail System**

Under the No Action alternative, the Federal lease would not be issued, so no impacts to the trail system would occur.



## **4.4 Cumulative Impacts Analysis**

“Cumulative impacts” are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. The cumulative impact area of analysis (CIAA) and past, present, and reasonably foreseeable actions vary by resource, and are described in the relevant resource section.

### **4.4.1 Air Quality and Climate Change**

#### **4.4.1.1 Air Quality**

The cumulative impact area for air quality is the Uinta Basin, plus all regional Class I areas and other environmentally sensitive areas (e.g., national parks and monuments, wilderness areas, etc.) near the Uinta Basin. Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance), oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased for tar sands mining by the State. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area, and another existing mine has begun south of the project area (Boteilho, 2008) (Trent, 2006). It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. The proposed Uintah Basin railway would also contribute to emissions in the analysis area.

Cumulative impacts to air quality and AQRV are incorporated by reference from the Monument Butte FEIS (BLM 2016), the BLM’s Air Resource Management Strategy (ARMS) Modeling Project (BLM 2014), and the recent UDAQ PM<sub>2.5</sub> maintenance plan model assessment (UDAQ 2019). These modeling analyses provide a reference for potential cumulative impacts due to regional oil and gas development. It is important to note that the ARMS model performance evaluation of ozone indicated a negative model bias (under predicts) during the winter and a positive model bias (over predict) during the summer in the 4 km domain. The model performance evaluation for PM<sub>2.5</sub>, indicated a negative model bias (under predict) throughout the year in the 4 km domain (BLM 2014). Overall, the UDAQ PM<sub>2.5</sub> model performance is good.

#### **Emissions**

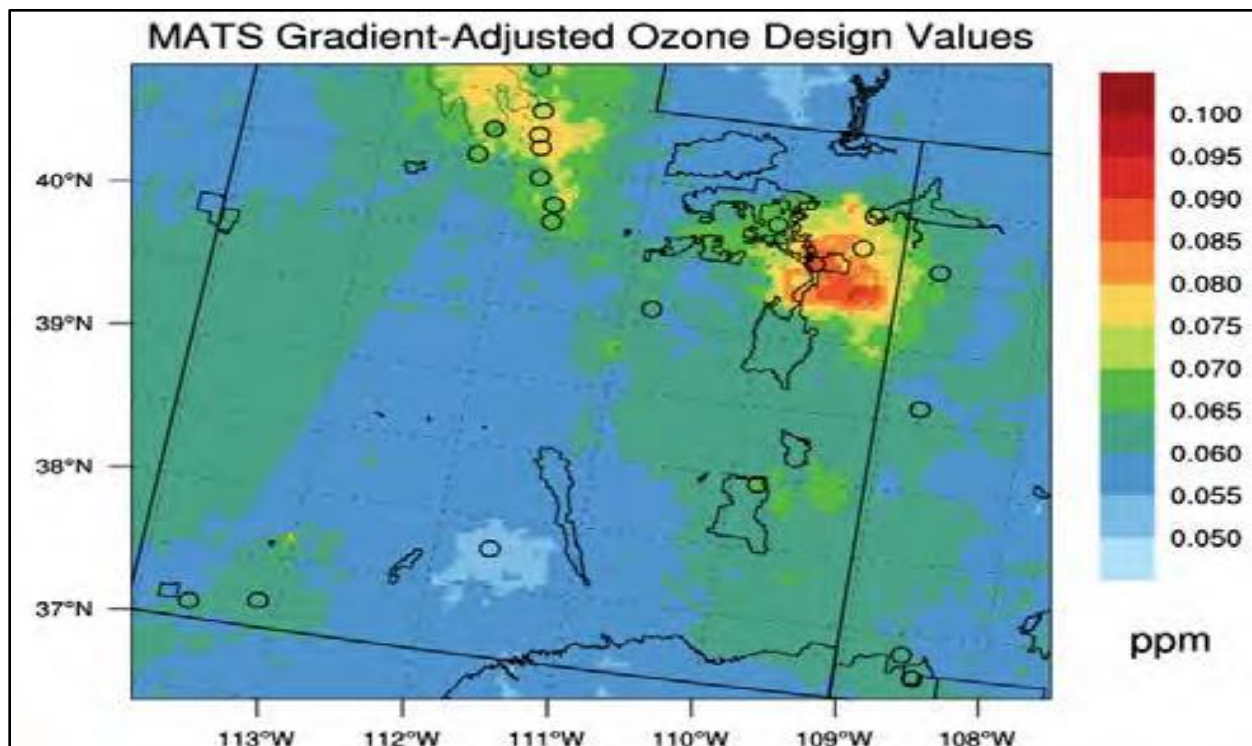
Past and present actions that have affected and would likely continue to affect air quality in the CIAA include surface disturbance resulting from oil and gas development and associated infrastructure, geophysical exploration, ranching and livestock grazing, range improvements, recreation (including OHV use), authorization of ROWs for utilities and other uses, and road development. Past and present actions in CIAA that have affected and would likely continue to affect air quality are too numerous to list here but would include the development of energy resources; the development of transportation corridors; and the development of various industries that emit pollutants. These types of actions and activities can reduce air quality through emissions of criteria pollutants (including fugitive dust), VOCs, and HAPs, as well as contribute to deposition impacts and to a reduction in visibility.

Emissions in the oil and gas sector roughly parallel oil and gas production. The oil and gas production growth estimates for the Rocky Mountain region are used from the EIA 2020 Annual Energy Outlook (EIA 2020) to provide an estimate of the change in emissions from oil and gas

sources in Utah. In the reference scenario projected oil and gas production growth remains relatively flat. Oil production is anticipated to decrease by an annual average of approximately 0.3% and gas production increase annually by approximately 0.1%. Similarly, oil and gas related emissions from existing and foreseeable wells, plus development of lease parcels, are anticipated to remain relatively flat compared to those reported in the 2017 National Emissions Inventory (UDAQ 2020).

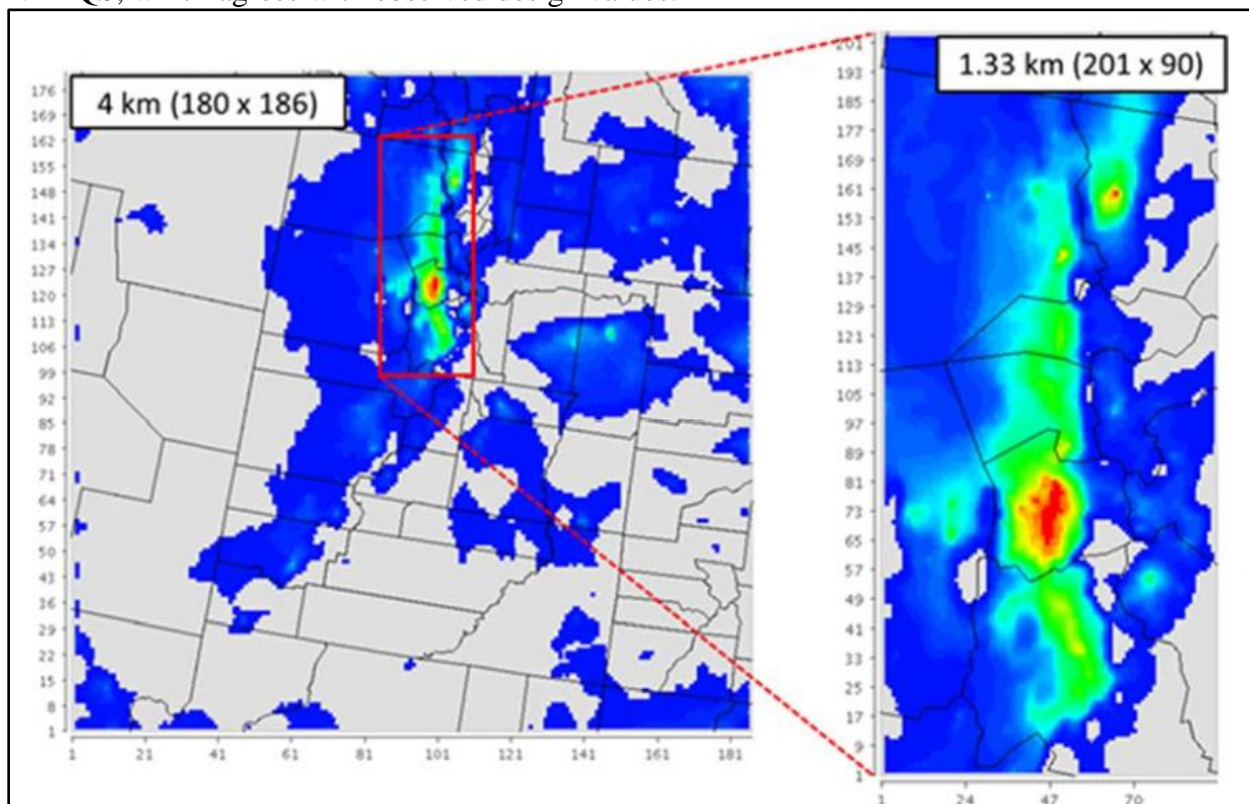
### Modeled Impacts

The BLM incorporates by reference the ARMS modeling results that were evaluated in the Monument Butte FEIS (BLM 2016). The ARMS model determined that in the 2021 future year, all assessment areas are within the applicable PSD increments for annual NO<sub>2</sub>, 3-hour SO<sub>2</sub>, annual SO<sub>2</sub>, and annual PM<sub>10</sub>, while most assessment areas exceed the 24-hour PM<sub>2.5</sub> and PM<sub>10</sub> PSD increment (BLM 2014). Figure 4.4.1.1-1 shows that the ARMS predicted ozone design values for the CIAA exceed the NAAQS, in the Uinta Basin and along the Wasatch Front metropolitan area. Other areas of the state have concentrations below the NAAQS, generally between 0.055 to 0.065 ppm. In Class I and Class II areas outside the Uinta Basin ARMS study area, O<sub>3</sub> concentrations are highest during the summer period (BLM 2014). For areas outside the Uinta basin, the modeling results are likely conservative due to the over prediction of summertime O<sub>3</sub> in the ARMS model. If background O<sub>3</sub> levels rise, outside the Uintah Basin, additional analysis may be needed when plans of development are submitted for the lease parcels.



**Figure 4.4.1.1-1. ARMS predicted ozone design values existing regulatory controls for oil and gas emissions in the year 2021.**

The UDAQ performed air quality modeling to predict future design values for the Daily PM<sub>2.5</sub> maintenance plan. PM<sub>2.5</sub> is primarily a wintertime air pollution problem in Utah due to strong inversions and valleys surrounded by tall mountains limiting the dilution of PM<sub>2.5</sub> forming pollutants. As a result, the UDAQ modeled three wintertime PM<sub>2.5</sub> episodes where meteorological conditions produced the best model performance. Model results show attainment of the standard at all locations in future years 2026 and 2035 (UDAQ 2019). The highest concentrations were predicted in counties along the Wasatch Front and in Cache Valley, see Figure 4.4.1.1. Elevated concentrations were modeled in the Uinta Basin but are well below the NAAQS, which agrees with observed design values.



**Figure 4.4.1.1-2. UDAQ CAMx photochemical modeling domains and predicted PM<sub>2.5</sub> concentrations from the January 7, 2011 episode (red represents higher concentrations, blue and gray are lower concentrations).**

Other emission contributors to ozone and PM<sub>2.5</sub> concentrations would continue at present rates such as construction, urban development, and personal vehicle use.

#### Air Quality Related Values

AQRVs were also analyzed in the ARMS modeling study. Visibility conditions in Class I areas generally show improvement in the 2021 future year scenarios relative to the 2010 Base Year and 2010 Typical Year. In general, the greatest improvement in visibility relative to the 2010 Typical Year occurs for the 2021 Scenario, which has the lowest oil and gas emissions of the four future year scenarios considered. Additionally, the BLM 202 Air Monitoring Report (BLM, 2020) shows that visibility has been improving at the Class I areas in Utah. Development of lease sale parcels would slightly increase the impacts to visibility but are not likely to be perceptible or substantially change the improving regional visibility trend.

The ARMS model results generally show a decrease in deposition values for the 2021 future year scenarios relative to the 2010 Typical Year. However, the differences in estimated deposition values between all four future year scenarios are generally very small. As identified in the Monument Butte FEIS (BLM 2016), acid neutralizing capacity change exceeds the 10 percent limit of acceptable change for all model scenarios at all seven lakes of interest.

Visibility and deposition conditions in Class I and Class II areas would likely follow current improving trends as described in the AMR (BLM, 2020).

#### *Hazardous Air Pollutants*

Existing emissions of HAPs in the CIAA are detailed in the Utah Division of Air Quality's 2014 Point Source Emissions Inventory (UDAQ 2018). The EPA has determined that for all of Utah the total cancer risk is 12 to 33 in 1 million (EPA 2019). This cancer risk is within the acceptable range of risk published by the EPA of 100 in 1 million as discussed in the National Contingency Plan, 40 CFR 300.430. The highest cancer risks in Utah are found in counties along the Wasatch Front and Washington County which are outside the CIAA. The noncancer respiratory hazard index for all of Utah is between 0.14 and 0.54. Hazard index values less than one are acceptable and noncancer respiratory risks are not expected.

The proposed action of leasing would not contribute to the emissions in the project area, although future development may contribute as described in **section 4.2.1**. See the **2012 PEIS section 4.6.1.1.3 and 6.2.6.3.5** for additional information on the nature of the effects. Any future plan of development would be subject to additional air quality analysis before the plan would be approved. The no action alternative would not result in an accumulation of impacts.

#### **4.4.1.2 Greenhouse Gases**

The cumulative impacts assessment area (CIAA) for GHG emissions and climate change occurs on various scales (local, state, national, and global). While emissions and climate change occur on multiple scales state and regional impacts are presented in this EA since the public tends to experience the impacts and adaptation at a local level (USGCRP, 2018) and this will provide the most meaningful information for the decision maker and the public living near the project.

GHG emissions from past and present activities from all sectors is provided in the affected environment section. The affected environment section also discusses the existing conditions and trends for atmospheric GHG concentrations and climate resulting from emissions of past and present actions. Estimates of foreseeable emissions and resulting climate conditions is presented in this section.

Past, present, and foreseeable emissions from oil and gas leasing in Utah (Federal and non-federal) is incorporated by reference from the 2020 Air Monitoring Report (BLM, 2020). Existing emissions from active producing oil and gas wells in Utah is 38.45 MMT CO<sub>2</sub>e/yr. and 29.78 MMT CO<sub>2</sub>e/yr. in the Vernal Field Office. From 2020 to 2050, the annual average oil and gas related emissions in Utah are estimated to range from 35.04 to 42.74 MMT CO<sub>2</sub>e/yr., with aggregate emissions between 1,086.27 to 1,325.05 MMT CO<sub>2</sub>e. In the Vernal Field Office, the foreseeable annual average estimate ranges from 27.05 to 33.09 MMT CO<sub>2</sub>e/yr. with aggregate

emissions ranging from 838.55 to 1,025.69 MMT CO<sub>2</sub>e. Approximately 55% of the emissions result from Federal leases as that is the current percentage of wells that extract Federal minerals.

The amount of oil that is estimated to be recoverable from tar sands in the Vernal Field Office ranges from 840 to 900 million bbl., as per the Asphalt Ridge Whiterocks and Vicinity Geologic Report, 1980. If all recoverable oil is extracted approximately 361 to 387 MMT CO<sub>2</sub>e (EPA, 2019) could be emitted during downstream combustion. However, it is unknown how many years it would take to extract all the oil or how much emissions from tar sands oil would contribute to the aggregate estimate of 838.55 to 1,025.69 MMT CO<sub>2</sub>e from the Vernal Field Office from 2020 to 2050.

Information provided in Appendix G, evaluates existing and potential future Federal fossil fuel emissions in the region and nation. Regional emissions include those that occur in Utah and neighboring fossil fuel producing states (Wyoming, Colorado, and New Mexico). Base year emissions are calculated for based on existing coal, oil, and gas production in each state. Future emissions from 2020 to 2050 are estimated by applying the EIA 2020 Annual Energy Outlook reference scenario production growth projections to the base year emissions. These projections provide an estimate of future emissions in the region and nation that may result from Federal leasing. For the base year, Utah's Federal fossil fuel GHG emissions are 4.58% of regional Federal emissions, and 4.18% of U.S. Federal emissions. Over the 2020 to 2050 timeframe the aggregate GHG emissions from Utah Federal fossil fuel leasing is 4.87% of regional Federal emissions and 4.42% of U.S. Federal emissions. Looking at only oil and gas leasing, the 2020 to 2050 aggregate GHG emissions from Utah oil and gas leasing is 6.10% of regional Federal oil and gas emissions and 2.85% of U.S. Federal emissions.

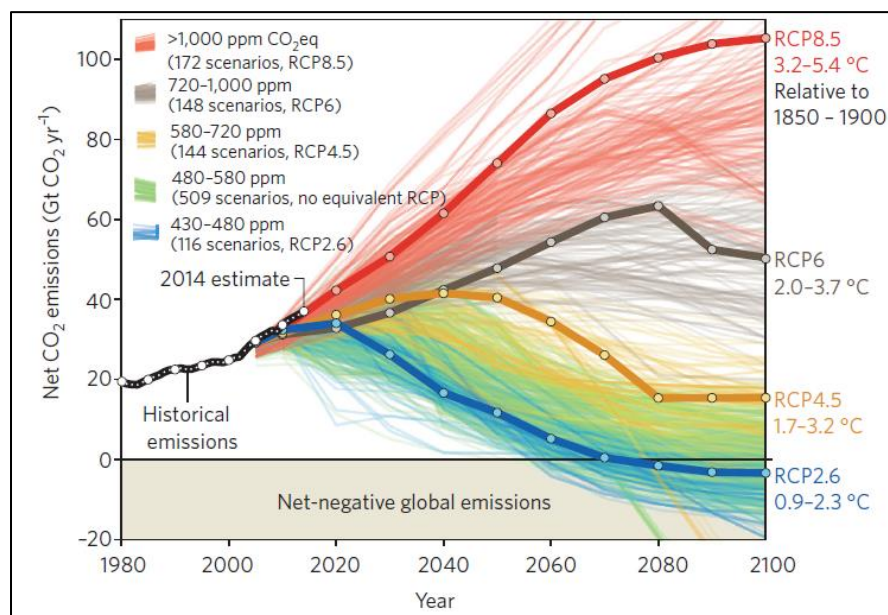
The University of Utah Kem C. Gardner Policy Institute developed The Utah Roadmap: Positive Solutions on Climate and Air Quality (Gardner, 2020), which projects future GHG emissions in Utah. The report provides estimates for a "Business as Usual" scenario that considers population and energy demand increases with currently scheduled emissions reduction measures not being implemented, and a "Planned Reduction" scenario that includes foreseeable emissions reductions from the end of life of coal power plants and the increased use of electric vehicles. In the "Business as Usual" scenario, the annual emissions for Utah increase to approximately 95 MMT CO<sub>2</sub>e by 2050, or a 32% increase above current emissions, whereas, the "Planned Reduction" scenario shows a decrease in Utah emissions to approximately 32 MMT CO<sub>2</sub>e by 2050, which is about a 55% decrease below current emissions. The roadmap set a goal to reduce GHG emissions to about 15 MMT CO<sub>2</sub>e, approximately 80% below current emissions, but additional action by the State of Utah is needed to reach this goal.

The U.S. Energy Information Administration (EIA) provides projections of energy sector GHG emissions through the year 2050. The EIA national emissions projections are contained in the Annual Energy Outlook report (EIA, 2020). In the United States, energy related GHG emissions in the reference scenario are projected to decrease over the short-term (4,674 MMT CO<sub>2</sub> in 2030) as the power sector transitions away from coal, but energy demands from the transportation and industrial sectors will cause emissions increases in later years through 2050 (4,922 MMT CO<sub>2</sub> in 2050). Economic growth is the biggest factor in national GHG emissions projections. For a high



economic growth scenario, emissions are 13% higher than the reference scenario in 2050 and the emissions in the low growth scenario are 11% lower than the reference by 2050. The EIA also reports global emissions projections in the International Energy Outlook report (EIA, 2019). Worldwide energy related GHG emissions are projected to increase by 0.6% per year from 2018 to 2050. Over the same time period annual energy sector emissions increases from about 35 billion metric tons CO<sub>2</sub>e to about 43 billion metric tons CO<sub>2</sub>e. GHG emissions from development of lease parcels would add cumulatively to other past, present, and foreseeable oil and gas emissions, as well as emissions from other sectors.

The IPCC developed various emissions scenarios, called Representative Concentration Pathways (RCP), to provide a consistent foundation for climate change modeling and impact assessment. There are four scenarios named after the amount of radiative forcing in watts per square meter (RCP2.6, RCP4.5, RCP6, and RCP8.5) that is projected to occur by the year 2100 if actual atmospheric concentrations of GHG's follow one of these paths. There are several other pathways that lead to each level of radiative forcing, but these four RCPs provide plausible emissions paths for assessing the range of possible changes to the climate. Figure 4.4.1. shows the different RCP emissions scenarios (bold lines) though the year 2100. Global energy related GHG emissions projections track closest to RCP6.0 and RCP4.5 though mid-century.



**Figure 4.4.1.2. GHG emissions pathways for lead to radiative forcing of 8.5 WATTS PER SQUARE METER (W/m<sup>2</sup>), 6.0 W/m<sup>2</sup> (gray), 4.5 W/m<sup>2</sup> (yellow), and 2.6 W/m<sup>2</sup> (blue) by the year 2100. Source of figure: (Fuss, et al., 2014)**

### Climate Change

The U.S. Geological Survey National Climate Change Viewer (USGS, 2019) can be used to evaluate potential climate change at the state and county level. Data presented in the climate viewer is intended to assist the scientific community in conducting studies on climate changes and to enhance public understanding of possible future climate impacts to their local communities. The viewer provides historical (1950-2005) and future (2006-2099) climate

projects under a moderate (RCP4.5) and aggressive (RCP8.5) emissions scenario. The climate viewer compiles projections from 30 different global climate models. Projected changes to maximum and minimum temperature and precipitation for Utah are presented in the 2020 Air Monitoring Report (BLM, 2020) and are summarized here.

For both the RCP8.5 and RCP4.5 GHG emissions scenarios temperatures increase above historical levels by mid-century and 2100. Projections for RCP8.5 begin to deviate from the RCP4.5 projections after mid-century and depending on the season are approximately 5°F or warmer by 2100. For the RCP4.5 scenario, both maximum and minimum temperatures level off approximately 5°F warmer than historical temperatures, while the RCP8.5 scenario shows a continued increasing trend at year 2100. Projected changes to monthly precipitation for both emission scenarios are minimal (not statistically significant) with respect to historic precipitation but show a slight increase in precipitation for RCP8.5 during the winter. The historical precipitation falls within the upper and lower ranges for all projected estimates of precipitation change. However, both the RCP8.5 and RCP4.5 projections show statistically significant lower amounts of snow water equivalent and runoff for all future time periods. In other words, less snowpack in the winter, more runoff during the winter, and less during the spring and summer. Further, the EPA report on What Climate Change Means for Utah (EPA, 2016) states that there may be increased frequency of drought and wildfires, increase the demand for water while reducing the water supply, and increased impacts to human health.

The proposed action may result in emissions of (19.8 CO<sub>2</sub>e) after all oil has been mined from the tar sand lease parcels (assuming 30-year period) which would be approximately 2.4% of the low (838.55 MMT CO<sub>2</sub>e) and 1.9% of the high (1,025.69 MMT CO<sub>2</sub>e) aggregate emissions from oil and gas wells in the Vernal Field Office. Annual GHG emissions estimated for the proposed action are approximately 0.92% for Utah and 0.01% of national emissions for a single year (3-4). All GHGs, regardless of the source, contribute incrementally to the climate change phenomenon. While GHG emissions resulting from individual decisions can certainly be modified or potentially prevented by analyzing and selecting reasonable alternatives that appropriately respond to the action's purpose and need, the BLM has limited decision authority to meaningfully or measurably prevent the cumulative climate change impacts that would result from global emissions.

The No Action Alternative would not contribute to an accumulative of impacts.

#### **4.4.2 Cultural: Archaeological Resources**

The CIAA for cultural resources is Asphalt Ridge. Past present and reasonably foreseeable actions in the cumulative impact area include surface mining, land use (such as right-of-way operation and maintenance), livestock grazing, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease.

According to the **2012 PEIS section 6.2.6.3.9 and 6.2.6.3.10**, cumulative impacts to cultural resources and potential TCPs from tar sands development may include complete site destruction,

site degradation, increased human access resulting in disturbance, and degradation of visual setting. Each impact is described below.

- Complete site destruction could result from clearing of the project area, grading, excavation, and construction of facilities and associated infrastructure if cultural sites are located within the footprint of the project.
- Site degradation and/or destruction could result from the alteration of topography, alteration of hydrologic patterns, removal of soils, erosion of soils, runoff into and sedimentation of adjacent areas, and contaminate spills if sites are located on or near the project area. Degradation could occur within the project footprint and in areas downslope or downstream. Erosion of soils could negatively impact sites downstream of the project area by eroding away materials and portions of the sites, while the accumulation of sediment could add a protective covering to the site. Contaminates may affect the ability to conduct analysis of material present and the ability to interpret site components.
- Increases in human access and subsequent disturbance (e.g. looting, vandalism, and trampling) of cultural resources could result from the establishment of corridors and facilities in otherwise inaccessible areas. Increased human use exposes cultural resources to a greater probability of impact.
- Visual degradation of settings associated with cultural resources could result from the presence of tar sands development and its associated land disturbances and facilities. Sites such as sacred sites and landscapes, historic trails, and historic landscapes which visual integrity is a component of significance could be affected.

The proposed action would contribute to these cumulative impacts by making available this parcel for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.3 Wildlife: Non-USFWS Designated**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for Fish and Wildlife Excluding U.S. Fish and Wildlife Service Designated Species is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface

disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

This section of the cumulative analysis includes golden eagle and raptors. Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Cumulative impacts include: disturbance from human activity (including harassment, displacement from nests or foraging areas, and noise); potential loss of nests; disturbances to breeding, nesting, and fledgling success; habitat loss, fragmentation and/or alteration; reduction of prey species; and disruption or alteration of seasonal migration routes. All four nests described in chapter 3 would be within 0.25 mile or less of a state lease that could be developed regardless of the Federal lease. The one golden eagle nest in Section 8 T5S R21E would be greater than 0.5 mile away, and on the opposite side of the ridge, from any anticipated mine development. The golden eagle nesting territory in section 31 would be within 0.5 mile of the existing mine and processing plant.

The proposed action would contribute to these cumulative impacts by making this parcel available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.4 Wildlife: Migratory Birds (including raptors)**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for Migratory Birds is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA

documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulative impacts to migratory birds include displacement from noise or human activity, loss of nesting and foraging habitat, habitat fragmentation and/or alteration, and disruption or alteration of seasonal migration routes. Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining.

The proposed action would contribute to these cumulative impacts by making this parcel available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.5 Wildlife: Threatened, Endangered, Candidate or Sensitive**

##### **4.4.5.1 Greater Sage Grouse (BLM Sensitive Species)**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for GRSG is the Uintah population area which consists of 2,355,390 acres. The project area consists of 2,155 acres of GRSG habitat.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Other activities occurring within the project area include development associated with the communities of Tridell, Lapoint, and Gusher, as well as unincorporated private lands, recreation development (hiking and mountain biking) on federal and state lands, and oil and gas development on BLM, state, and private lands. The actions with the potential to contribute to surface disturbance include development of tar sands in the Asphalt Ridge STSA, new and existing mineral rights or realty actions (for example, pipeline or road rights of way), as well as municipal or private land development.

Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (estimated to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 2,115 acre area, or approximately 0.0009% of the occupied habitat area) would be directly disturbed by surface mining. Cumulative impacts (direct and indirect) from all past, present, and reasonably foreseeable development in the CIAA include loss of some brood-rearing and some winter GRSG habitat and habitat fragmentation and/or alteration. The observatory lek is located within 0.25 mile of past, present, and reasonably foreseeable activities in Sections 27 and 34 of Township 5 South, Range 21 East. No surface disturbance is anticipated to occur in the area of the lek due to the depth of overburden which would make surface mining infeasible. According to research, a 0.25 mile no surface occupancy buffer for sage grouse leks is inadequate (Holloran, 2005) (Smith, 2009). Holloran recommends a minimal 5 km (3 miles) NSO buffer would be adequate to minimize impacts to sage grouse. It is anticipated that the nearest surface disturbance associated with the mining of this parcel would be located 2.5 miles from the lek and the lek is now considered historic as of spring 2020 because no GRSG have been observed utilizing the lek for 10 years. Impacts to sage grouse in the brooding or wintering habitat could include mortality of adults and fledglings resulting from collisions with vehicles, the loss of wintering and brooding habitat, emigration, and decreased survival (Holloran, 2005).

The proposed action would contribute to these cumulative impacts by making this parcel available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.5.2 Burrowing Owl and White-tailed Prairie Dog**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for burrowing owl and white-tailed prairie dog is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents.

Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

This section of the cumulative analysis will include burrowing owl, and white-tailed prairie dog. Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Cumulative impacts include loss of nests, loss of habitat, habitat fragmentation and/or alteration, and disruption or alteration of seasonal migration routes. Impacts to burrowing owl could include disturbances to habitat, breeding, nesting, and fledgling success. Additional impacts could include displacement from foraging areas, reduction of prey species, and loss of habitat. Impacts to white-tailed prairie dogs include disturbance of habitat, making it less suitable for the establishment of colonies. Also, as traffic volumes and/or project-related activities increase adjacent habitats may be avoided due to human presence, noise, and the potential influx of invasive weeds. Weed invasions may lead to a decrease in the amount of native perennials and bare ground, thereby degrading habitat for prairie dogs by decreasing visibility, forage quality, and burrow development. Although prairie dogs are often found on or near roadways, prairie dog colonies are typically fragmented by road development or other permanent structures.

The proposed action would contribute to these cumulative impacts by making this parcel available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.6 Big Game (Mule Deer)**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for mule deer is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past, present, and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land

Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulative impacts to mule deer include displacement from noise or human activity, loss of fawning and foraging habitat, and habitat fragmentation and/or alteration. Also, as traffic volumes and/or project-related activities increase, adjacent habitats may be avoided due to human presence, noise, and the potential influx of invasive weeds that could reduce forage quality. Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining.

The proposed action would contribute to these cumulative impacts by making this parcel available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.7 Soils**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.2**. The CIAA for Soils is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA



documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulative impacts include direct damage to soils, which could result in increased erosion and sediment yields, and mixing of soil horizons.

The proposed action would contribute to these cumulative impacts by making federal land available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.8 Plants: Invasive and Noxious Weeds, Native Communities, and BLM Sensitive**

##### **4.4.7.1 General Vegetation Including Invasive/Noxious Weeds, Woodlands/Forestry**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for General Vegetation, Woodland/Forestry, and Invasive and Noxious Weeds is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are

108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulative impacts include disturbance or loss of vegetation, disturbance of soils and habitats, and weed invasions. Absent weed control, non-native species that establish may spread resulting in a degradation of the native plant community.

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.7.2 Special Status Plant Species**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.7**. The CIAA for Special Status Plant Species is a 176,159-acre area encompassing the entire potential habitat for the Hamilton milkvetch, Horseshoe milkvetch, Sterile yucca, and Goodrich's penstemon. Due to inclusions of areas of unsuitable habitat within the potential habitat area, the total acreage of suitable habitat is less than 176,159 acres. However, a complete survey of potential habitat has not been performed and thus the amount of suitable habitat has not been quantified.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Within the CIAA, there are two active, approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS ROD (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 352 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 55 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 275 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.2% of the CIAA). There are currently 28 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 140 acres of surface disturbance (0.1% of the CIAA). Finally, 2 wells are currently proposed that do not tier to these documents that will result in 10 acres of surface disturbance (0.0% of the CIAA). Within the

CIAA, there are approximately 509 miles of roads outside of the area that have been converted for agriculture or urban development.

No studies on the demographics or habitat quality have been initiated to date on any of the special status plant species found within proposed project area. It is assumed that above conversion of suitable to non-suitable habitat by human activities has resulted in a cumulative degradation of range wide habitat and an overall decline in species viability; however, the exact extent of the impacts of the development is unknown given that the distribution of populations relative to disturbance is unknown. Cumulative impacts may also include a decline in population vigor of special status plants through the loss of pollinators and pollinator habitats, the increase in fugitive dust emissions, and the spread of weeds.

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.9 Visual Resources**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.8**. The CIAA for Visual Resource Management is the Vernal Valley and Asphalt Ridge Scenic Quality Rating Units. Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. The BLM does not manage or track visual impacts on state or private lands.

Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Potential impacts would be associated with construction equipment and activity, cleared project areas, and the type and visibility of individual project components such as high walls, processing facilities, utility ROWs, and others. The nature, magnitude, and extent of project-related impacts would depend on the type, location, and design of the individual project components of the various leases. For the Vernal Valley Scenic Quality Rating Unit, cumulative impacts include changes in adjacent scenery (Asphalt Ridge) from surface disturbing activities. For the Asphalt Ridge Scenic Quality Rating Unit, cumulative impacts include changes to landform, vegetation, and color from surface disturbing activities. From the KOPs of Highway 40 and the Bonanza Highway, viewers would be likely to perceive some level of visual impact from a commercial project on federal, state, or private leases, with impacts expected to be greater for resources within the foreground-middle ground distance, and lesser for those areas within the background distance. Beyond the background distance, the cumulative impacts would likely result in low levels of visual contrast.

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.10 Water: Groundwater Quality, Surface Water Quality**

##### **4.4.10.1 Surface Water**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.4 and 6.2.6.3.13**. The CIAA for Surface Water is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project (NatureServe, 2004) data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Cumulative impacts could include contamination by salts, metals, and hydrocarbons. Similar to metallic ores and phosphate development, tar sands development could generate produced water and large volumes of overburden; however, wet tailings would not be generated (Bureau of Land Management, 2012a), instead "stackable" dry sand and clay tailings have resulted from Asphalt Ridge processing (Coleman & Adams, 2004). Increases in erosion rates and deposition rates could affect the hydrology within the targeted Hydrologic Unit Boundaries in the area. Modification of surface drainage and water extraction could also cause flow regime and morphological changes of stream channels. These could all contribute cumulatively to negative affects to water quality.

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for future surface disturbance should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.9.2 Groundwater**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.4 and 6.2.6.3.13**. The CIAA for Ground Water is an 117,077-acre area encompassed by the following six sub-watersheds; Ashley-Mantle Gulch, Ashley Creek, Collier Draw-Green River, Lower Twelvemile Wash, and Middle Twelvemile Wash.

Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease. Surface disturbance is a good indicator for the cumulative impacts in the CIAA. Based upon the Southwest Regional Gap Analysis Project data within the CIAA approximately 19,104 acres (16.3% of the CIAA) have been converted to agriculture use and 239 acres (0.2% of the CIAA) have been converted to urban development. Within the CIAA, there are two active approved field development NEPA documents, Newfield Production Company's Gusher Field Development EA (Bureau of Land Management, 2008d) and QEP Energy's Greater Deadman Bench Oil and Gas Producing Region EIS Record of Decision (Bureau of Land Management, 2008e). In total 5,032 acres of surface disturbance was authorized across the analysis areas of these documents. If the disturbance is relatively uniform throughout the project area, then approximately 233 acres of surface disturbance has occurred or will occur within the CIAA (0.2% of the CIAA). As of June 10, 2011, there are 108 abandoned oil and gas locations outside of the scope of the field development documents. Using the assumption of 5.0 acres of disturbance per well (including associated roads and pipelines), as per the Vernal Resource Management Plan (Bureau of Land Management, 2008), 540 acres of the CIAA were disturbed some point in the past and are in various stages of reclamation (0.5% of the CIAA). There are currently 47 well pads that serve as platforms for actively producing wells not permitted under these documents. Using the above assumption, this has resulted in 235 acres of surface disturbance (0.2% of the CIAA). Within the CIAA, there are approximately 354 miles of roads outside of the area that has been converted for agriculture or urban development.

Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2,000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Cumulative impacts could include contamination by salts, metals, and hydrocarbons. Some of the cumulative activities would generate produced water. Produced water can be used for non-potable purposes, such as fugitive dust control, provided it is free of contamination from polar organics (e.g., benzene, naphthalene, toluene, and phenanthrene), inorganics (e.g., lead, arsenic, and sulfide), or naturally occurring radioactive materials and exhibits no brackish character. Produced water may need special management because of high concentrations of sodium, chloride, calcium, or magnesium. Discharge of high-

salinity waters to the ground surface or surface waters would be prohibited, and capture and treatment or reinjection would be required (Bureau of Land Management, 2012a).

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for groundwater contamination of ground water production should the lease be developed. The no action alternative would not result in an accumulation of impacts.

#### **4.4.9.3 Water Consumption**

Cumulative impacts are incorporated by reference to **2012 PEIS section 6.2.6.3.4**. For water use and consumption, the CIAA is the Upper Colorado River Basin. Past, present, and reasonably foreseeable water uses in the Basin include oil and gas, mining, industrial, agricultural, and domestic uses.

The cumulative impacts for water consumption are impossible to quantify because it is dependent upon extraction and processing methods used. Water is used to support regional population growth, potential water exports to areas outside the Upper Colorado River Basin, new instream flow water rights for protecting endangered species, and for other development. Currently, most of the water use in the Upper Colorado Basin is for agricultural purposes (Bureau of Land Management, 2012a).

The proposed action would contribute to these cumulative impacts by making land available for lease with the potential for water consumption should the lease be developed. The level of oil shale development that could be supported by available water over the next 20 years depends on the type of technology used, the scale of the development, and the other competing uses of water at the time of development. An alternative to make more water available is to transfer water from current agricultural use to industrial use. Any water transfer and new water development must meet different state and federal regulations. Water rights are not adjudicated by the BLM. Eventually, whether enough water is available for oil shale development depends on the results of negotiations among various parties, including water right owners, state and federal agencies, and municipal water providers as well as the developers (Bureau of Land Management, 2012a). The no action alternative would not result in an accumulation of impacts.

#### **4.4.11 Special Designations – McCoy Flats Trail System**

The CIAA for the McCoy Flats Trail System is Townships 5 and 5 South, Range 20 and 21 East, which comprise the legal description of the McCoy Flats Trail System EA DOI–BLM–G010–2012–0057, dated October 2012. Past present and reasonably foreseeable actions in the cumulative impact area include urban activities, land use (such as right-of-way operation and maintenance) oil and gas development, surface mining, livestock grazing and other ranching activities, and recreation. Approximately 16,241 acres of State-administered lands adjacent to the parcel have been leased previously. In addition, an existing private mine and processing plant operates intermittently adjacent to the project area. It is anticipated that mining of the resource on that land and processing in the plant would occur regardless of the federal lease.

Cumulatively, it is assumed that the east side of the Asphalt Ridge Special Tar Sands Area (assumed to be a 16 mile by 2000 foot area based on the STSA boundary, surface expressions of the resource, and the width of the existing mine on private surface, a 3,878 acre area) would be directly disturbed by surface mining. Potential impacts would be associated with construction equipment and activity, cleared project areas, and the type and visibility of individual project

components such as high walls, processing facilities, utility ROWs, and others. The nature, magnitude, and extent of project-related impacts would depend on the type, location, and design of the individual project components of the various leases. Development west of the rim of Asphalt Ridge is not foreseeable at this time due to depth of overburden.

Due to the ridge top topography and elevation change between the trail and anticipated development, under the proposed action no impact is anticipated to recreationists on the trail. The no action alternative would not result in an accumulation of impacts.

## 5.0 Consultation and Coordination

### 5.1 Introduction

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. The ID Team Checklist provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described in sections 5.2 and 5.3 below.

### 5.2 Persons, Groups, and Agencies Consulted

**Table 5.2. List of all Persons, Agencies and Organizations Consulted for Purposes of this EA**

<b>Name</b>	<b>Purpose &amp; Authorities for Consultation or Coordination</b>	<b>Findings &amp; Conclusions</b>
Utah State Historic Preservation Office	Section 106 National Historic Preservation Act	Consultation was conducted through the Programmatic Oil Shale and Tar Sands Final EIS, as documented in <b>2012 PEIS Appendix L</b> . Consultation on the specific lease parcel was initiated on February 12, 2013. A response concurring with the No Adverse Effect determination was received on February 21, 2013.
Tribal Consultation	Government to Government Consultation	Tribal consultation letters were sent on 5/24/2011. Responses were received from the Pueblo of Laguna and the Hopi Tribe. The Pueblo of Laguna have determined that the undertaking will not have a significant impact. The Hopi Tribe has requested copies of SHPO consultations for cultural resource inventories of the project: those inventories will be forwarded to the Hopi Tribe for review as they are completed at the site-specific stage.
Utah Public Lands Policy Coordination Office	Washington Office Instruction Memorandum 2012-043 Greater Sage-grouse Interim Management Policies and Procedures	Coordination with the local region of Utah DWR was initiated via phone in 2012 regarding impacts to sage grouse occupied habitat and golden eagle nests. No mitigation was identified by the DWR for sage grouse habitat. A mitigation measure to drop the portion of the lease that overlaps the golden eagle nests was identified and incorporated as mitigation into this document. Coordination with the Utah



		<p>PLPCO regarding impacts to sage-grouse was initiated on August 29, 2012. On September 19, 2012, a response was received that this project is outside the State's Sage Grouse Management Areas, so no more than minor adverse impacts are expected. A secondary consultation with UDWR/PLPCO dated November 17, 2020 was initiated by the BLM due to the time elapsed from the initial consultation in 2012 until now. This secondary consultation found that the Sage Grouse habitat in the area has not been regularly used in the last 10 years and the proposed mitigation is suitable to maintain the habitat in the area.</p>
U.S. Fish and Wildlife Service	Bald and Golden Eagle Protection Act and Endangered Species Act	<p>Coordination regarding the impacts to golden eagles was initiated on March 6, 2013. Their specific recommendations were received on July 11 and are addressed in the project record.</p>
U.S. Fish and Wildlife Service	Section 7 Endangered Species Act	<p>No threatened or endangered species occur within the parcel. The parcel occurs within 5 miles of the Green River which is habitat for four endangered fish species. The Vernal RMP Biological Opinion (BO) recognized tar sands leasing as an activity or management prescription under the Vernal RMP, and it enumerated the exploration and extraction impacts to the Colorado River fish. The BO concluded that tar sands leasing is not likely to jeopardize the continued existence of the Colorado River Fishes, and is not likely to jeopardize the continued existence of those species or adversely modify their habitats (Fish and Wildlife Service, 2008b). The Asphalt Ridge tar sands parcel being considered for leasing falls within the scope of the Vernal RMP's Section 7</p>

		consultation, and therefore no additional consultation is necessary at this time.
Governor's Consistency Review	43 CFR 3141.4-1	A coordination letter from the BLM was received by PLPCO on May 17, 2013. A response dated July 2, 2013 expressed full support for the proposed action, citing Governor Herbert's Ten-Year Energy Plan's strategies and objective to facilitate balanced, responsible development of Utah's energy resources.
Uintah County	National Environmental Policy Act: Cooperating Agency.	Uintah County participated in the interdisciplinary team meeting held by the BLM for this project on October 18, 2010. Any proposed alterations to County roads as a result of development of the parcel would be coordinated through the County. All comments submitted by Uintah County are addressed in the project record.
Vernal City	National Environmental Policy Act: Interested Party	Vernal City Assistant Manager Allen Parker was contacted on July 8 regarding the proposed project. The EA was forwarded to him for review and comment. An email was received on July 17 that Vernal City had no comment on the project.
Naples City	National Environmental Policy Act: Interested Party	Naples City Manager Chris Hoem was contacted on July 8 regarding the proposed project. The EA was forwarded to him for review and comment. He indicated verbally on July 15 that Naples City had no comment on the project.

### ***5.3 Summary of Public Participation***

The proposed action was posted to the public Environmental Notification Bulletin Board with its assigned NEPA number on April 30, 2010. A public comment period for the EA was held from May 14 to June 14, 2013. Notice of the comment period was posted on the BLM Utah webpage, the BLM Vernal NEPA documents webpage, the ENBB, and in the following newspapers: The Salt Lake Tribune, the Deseret News, the Sun Advocate, and the Moab Times Independent. The BLM received 42 comment letters expressing opposition to the proposed lease and 10 comment letters expressing support for the proposed lease. In addition, eight comment letters were received that contained substantive comments. Responses to those comments are contained in the project

record. After the ENBB was decommissioned, the EA was posted to the BLM NEPA Register on December 21, 2016 at <https://go.usa.gov/xnxtw>.

Since the close of the comment period, this EA has been updated to include the decisions from the Utah Greater Sage-Grouse Approved Resource Management Plan Amendment (2015) ), the area's designation as non-attainment of the National Ambient Air Quality Standard for ozone, and the designation of the McCoy Flats Trail System by the John D. Dingell Jr. Conservation, Management, and Recreation Act of 2019. Given the time that has elapsed since the completion of the 2013 public comment period , it has been determined that an additional public comment period will be held from December 7, 2020 through December 22, 2020.

**Table 5.3. List of BLM Preparers (BLM reviewers are listed in Appendix A)**

<b>Name</b>	<b>Title</b>	<b>Responsible for the Following Section(s) of this Document</b>
Stephanie Howard	NEPA Coordinator	Air Quality, Water: Surface Water Quality
Garrett Manion	Geologist	Water Resources
William Reitze	Archaeologist	Cultural Resources
Jessica Farmer	Recreation Planner	Visual Resources, Special Designations – McCoy Flats Trail System
Lisa Boyd	Natural Resource Specialist	Plants: Invasive and Noxious Weeds and Native Communities and BLM Sensitive
Iain Emmons	Wildlife Biologist	Wildlife: Migratory Birds, Non-USFWS Designated, Threatened, Endangered, Proposed, or Candidate
Branon Rochelle	Natural Resource Specialist	Soils
Garrett Manion	Natural Resource Specialist / Environmental Scientist	Water: Ground water quality
Natasha Hadden	Wildlife Biologist	Greater Sage Grouse

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## APPENDIX A: Interdisciplinary Team Checklist

**Project Title:** Tar Sands Lease Sale

**NEPA Log Number:** DOI-BLM-UT-G010-2010-0199-EA

**File/Serial Number:**

**Project Leader:** Stephanie Howard

### Determination of Staff:

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Rationale for Determination is required for all “NIs” and “NPs”. Write brief issue statements for “PIs” and state that they are analyzed in detail in Chapter 4 of the EA

**Appendix Table A-1. IDT Checklist**

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Air Quality & Greenhouse Gas Emissions	No emissions would occur from leasing. However, if the lease is issued, any future development could result in emissions as discussed in Chapters 3 & 4 of the EA. Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development.	Erik Vernon Stephanie Howard	11/1/20 11/20/20
NP	BLM natural areas	No designated BLM Natural Areas are located in the project area as per GIS review.	Stephanie Howard	11.20.20
PI	Cultural: Archaeological Resources	A review of cultural resource records, including a Class I survey, indicates that there are known cultural resource sites within the proposed project area. Cultural resource inventories have not been completed for the entire project area. Class III intensive cultural inventories and consultations with the Utah State Historic Preservation Office will be completed for individual development plans. Potential impacts to NHRP eligible resources will be mitigated prior to	William Reitze	11/10/20



<b>Determination</b>	<b>Resource/Issue</b>	<b>Rationale for Determination</b>	<b>Signature</b>	<b>Date</b>
		any surface disturbing activities. Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development. Reanalysis of this determination was conducted in 2020 and did not find anything which would require a change to the EA.		
NI	Cultural: Native American Religious Concerns	A review of cultural resource records, including a Class I survey, indicates that there are known cultural resource sites within the proposed project area. Cultural resource inventories have not been completed for the entire project area. Class III intensive cultural inventories and consultations with the Utah State Historic Preservation Office will be completed for individual development plans. Potential impacts to NHRP eligible resources will be mitigated prior to any surface disturbing activities. Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development. Reanalysis of this determination was conducted in 2020 and did not find anything which would require a change to the EA.	William Reitze	11/10/20
PI	Special Designations - John Wesley Powell NCA & McCoy Flats Trail System	The parcel is not within the John Wesley Powell NCA. However, a portion of the project area overlaps approximately 0.7 mile of the Jackalope mountain bike trail which is part of the McCoy Flats Trail System designated by Public Law 116-9, the March 12, 2019 John D. Dingell, Jr. Conservation, Management, and Recreation Act. No impact will occur from leasing. However, the trail is	Jessica Farmer	11/20/20

<b>Determination</b>	<b>Resource/Issue</b>	<b>Rationale for Determination</b>	<b>Signature</b>	<b>Date</b>
		located in its entirety on the west side of Asphalt Ridge, and future development is anticipated to occur below the east side of Asphalt Ridge, so no impact to the trail would occur. The trail comes within about 0.25 to 0.5 mile of the surface expressions of the tar sands resource; however, the trail is approximately 300 feet above the anticipated development level. Due to the ridge top topography and elevation change between the trail and anticipated development, no impact is anticipated to recreationists on the trail.		
NP	Designated Areas: Areas of Critical Environmental Concern	No designated ACECs are located in the project area as per GIS review.	Jessica Farmer	11/20/20
NP	Designated Areas: Wild and Scenic Rivers	None present as per Vernal RMP GIS data.	Jessica Farmer	11/20/20
NP	Designated Areas: Wilderness Study Areas	None present as per Vernal RMP GIS data.	Jessica Farmer	11/20/20
NI	Environmental Justice	No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. The proposed project is located on BLM-managed minerals, and private- or BLM-administered lands within the exterior boundary of the Uncompagre Indian Reservation as established by the 10 <sup>th</sup> District Court. The proposed alternatives would not likely create disproportionately high and adverse human health impacts or environmental effects on minority	Stephanie Howard	11/20/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>or low-income populations since there are none in the project area.</p> <p>The analysis in <b>2012 PEIS sections 5.13, 6.2.2.12, 6.2.5.12, and 6.2.6.3.12</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>		
NP	Farmlands (prime/unique)	<p>All prime or unique farmlands in the Uinta Basin must be irrigated to be considered under this designation, among other factors. No irrigated lands are located in the proposed action area; therefore, this resource will not be carried forward for analysis.”</p>	Stephanie Howard	11/20/20
NI	Fuels/Fire Management	<p>There are no fuels projects proposed for the area. The proposed action would remove the current primary fire carrier of sagebrush, rabbitbrush, and juniper trees from the surface. Following the Green River District Reclamation Guidelines (Bureau of Land Management, 2016) should reduce the risks associated with high densities of invasive annual grasses. High densities of annual invasive grasses can change fire dynamics by changing fire frequencies and intensities.</p>	Blaine Tarbell	12/3/20
NI	Geology / Minerals / Energy Production	<p>No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. No oil and gas leases are present in the project areas. Leasing the land will not have any effect on geology, other mineral resources, or energy production.</p> <p>The analysis in <b>2012 PEIS sections 5.2, 5.3, 6.2.2.1, 6.2.2.2, 6.2.5.1, 6.2.5.2, 6.2.6.3.1, and 6.2.6.3.2</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>	Garrett Manion	11/23/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Lands/Access	<p>No impacts are anticipated beyond those previously disclosed in the 2012 PEIS.</p> <p>Right-of-way holders are present in the project areas. R/W holders would be notified by BLM upon site specific proposals located on Federal surface.</p> <p>Private and State surface occurs throughout the majority of the project area. Surface authorizations would need to be obtained from the surface owner(s) upon site specific proposals.</p> <p>Cadastral survey markers may be present in the surface mining area. The following lease notice would be sufficient to protect the resource:</p> <p><b>CADASTRAL MONUMENT STIPULATION</b></p> <p>If in the course of operations any monuments, corners, or accessories are destroyed, obliterated, or damaged by such operations, the operator shall immediately report the matter to the authorized officer. Any disturbed corner positions shall be remonumented, in their original and/or restored positions, in accordance with the standards and guidelines found in the Manual of Surveying Instructions, U.S. Department of Interior. The operator will pay for the remonumenting of any corners that are destroyed or obliterated or damaged. This work shall be conducted at the expense of the operator, by the BLM.</p> <p>The analysis in <b>2012 PEIS sections 5.2, 6.2.2.1, 6.2.5.1, and 6.2.6.3.1</b> is determined to be sufficient disclosure of potential future development</p>	Stephanie Howard	11/20/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		activities for the purposes of this leasing decision.		
NP	Lands with Wilderness Characteristics	None present as per Vernal RMP GIS data. Most of the parcels are isolated by state or private land and are less than 5,000 acres. The large southern parcel was a portion of the McCoy Flat inventory area and was found in 2011 to not contain wilderness characteristics.	Jessica Farmer	11/20/20
NI	Livestock Grazing & Rangeland Health Standards	<p>No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. Five of the tracts are within the McCoy Flat Allotment which is an active cattle grazing allotment. Four other tracts are outside of any BLM grazing allotment. Of the five parcels that are in the grazing allotment, four of them are on relatively steep hillsides on the east side of Asphalt Ridge which has limited accessibility for cattle grazing. Potential development of these four parcels would have no impact to livestock grazing.</p> <p>One tract (Sec. 27, S½SW¼, SW¼SE¼; Sec. 34, all) is on the gentle western slope of Asphalt Ridge, dominated by salt desert scrub with some sagebrush and perennial grasses. This tract is accessible to livestock grazing. On this tract, there is a guzzler water development that is used by both livestock and wildlife, and a long-term range trend study.</p> <p>The current proposal is to lease these tracts for tar sands development. Potential future development of tar sands operations on the leased parcel may have impacts to grazing or range improvements which will be analyzed on a site-specific basis</p>	Dusty Carpenter	12/2/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>when a mine plan is received (CFR 3141.08 (c2). At that time implementation of the Green River District Office Reclamation Guidelines (Bureau of Land Management, 2016) will help to reduce future potential impacts to grazing and rangeland health.</p> <p>The analysis in <b>2012 PEIS sections 5.2, 6.2.2.1, 6.2.5.1, and 6.2.6.3.1</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>		
NI	Paleontology	<p>No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. The act of leasing will not affect paleo resources. Two known paleo localities are present in T5S R21E Section 23. Several other localities are in nearby sections but out of the lease area. To be protective of the paleo resources, any future surface disturbing activity will require a paleo survey conducted by a permitted paleontologist. The following lease notice would be sufficient to protect the resource:</p> <p><b>HIGH POTENTIAL PALEONTOLOGICAL RESOURCES</b></p> <p>The lessee/operator is given notice that lands in this lease have been identified as having high potential for paleontological resources. Planned projects should be consistent with BLM Manual and Handbook H8270-1, Chapter III (A) and III (B) to avoid areas where significant fossils are known or predicted to occur or to provide for other mitigation of possible adverse</p>	Garrett Manion	11/20/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>effects (RX, NF, ESR). Modifications to the Surface Use Plan of Operations may be required in order to protect paleontological resources from surface disturbing activities in accordance with Section 6 of the lease form terms and 43 CFR 3101.1-2.</p> <p>The analysis in <b>2012 PEIS sections 5.4, 6.2.2.3, 6.2.5.3, and 6.2.6.3.3</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>		
PI	Plants: Invasive and Noxious Weeds	Future surface disturbance associated with the development of the lease will likely lead to the spread of existing weeds and lead to the possible introduction of additional non-native plant species to the project area. The operator would be required to comply with the Vernal Weed Policy (Bureau of Land Management, 2017). Stipulations and/or notices are not warranted.	Lisa Boyd	11/19/20
PI	Plants: Native Communities	Surface mining would result in disturbance to the native plant communities. No stipulations or notices are warranted.	Lisa Boyd	11/19/20
PI	Plants: BLM Sensitive	There are several known populations of Hamilton milkvetch ( <i>Astragalus hamiltonii</i> ), a bureau sensitive plant species in close proximity to the proposed parcels and which may be found within the parcels. A small portion of the Horseshoe milkvetch polygon is within the project area, but no plants are in the area per GIS review. Based off soil data Goodrich's beardtongue ( <i>Penstemon goodrichii</i> ;) may also be present within the lease parcels. Sandy soils may be potential habitat	Lisa Boyd	11/19/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		for <i>Yucca sterilis</i> . Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development. Surface mining will result in disturbance to the native plant communities. No stipulations or notices are warranted.		
NP	Plants: Threatened, Endangered, Proposed, or Candidate	There are not currently listed threatened, endangered, or candidate plant species in the vicinity of the proposed project. See <b>Appendix C's</b> list of plant species and potential for occurrence.	Lisa Boyd	11/19/20
NI	Recreation	No impacts are anticipated beyond those previously disclosed in the PEIS. The proposed project is entirely within the Extensive Recreation Management Area (ERMA). The project area is in a limited to designated routes OHV section. The analysis in <b>2012 PEIS sections 5.2, 6.2.2.1, 6.2.5.1, and 6.2.6.3.1</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision. Should the lease be issued, and a plan of development proposed, additional NEPA will be necessary to determine the impact, if any, to recreationists.	Jessica Farmer	11/20/20
NI	Socioeconomics	No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. Effects on social and economic values from the act of leasing would be minimal and would not require further analysis due to the small-scale nature of the action when compared to the larger economy in the area. Coordination	Stephanie Howard	11/20/20



Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>with leaders of adjacent communities confirmed that they had no concerns or comments on the proposal (see consultation/coordination section in chapter 5). Should the lease be issued, and development proposed, impacts to social and economic values will be revisited on a site-specific basis.</p> <p>The analysis in <b>2012 PEIS sections 5.12, 6.2.2.11, 6.2.6.3.11, and Appendix G</b>, is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>		
PI	Soils: Physical / Biological	Potential for soil erosion due to surface disturbing actions. At the site-specific stage, upon receipt and review of a plan of operations, the BLM would consider alternatives or additional mitigation as necessary to minimize impacts to the soils resource due to surface mining.	Branon Rochelle	11/24/20
PI	Visual Resources	VRM Class III exists. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Based on current mining technology, pit mines are the current technique that would be utilized in this project. Pit mines as observed from residences in Vernal City (KOP) as well as travelers along highway 40 (KOP) traveling through the asphalt ridge area, and the Bonanza Highway (KOP) would	Jessica Farmer	11/20/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		notice mining activities and current technology for tar sands extraction (Strip mining operations, and underground mining and associated facilities) would dominate the view of the casual observer. Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development.		
NI	Wastes (hazardous/ solid)	<p>No impacts are anticipated beyond those previously disclosed in the 2012 PEIS.</p> <p><u>Hazardous Waste:</u> No chemicals subject to reporting under SARA Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the project. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used, produced, stored, transported, or disposed of in association with the project.</p> <p><u>Solid Wastes:</u> Trash would be confined in a covered container and hauled to an approved landfill. Burning of waste or oil would not be done. Human waste would be contained and be disposed of at an approved sewage treatment facility.</p> <p>The analysis in <b>2012 PEIS sections 5.14, 6.2.2.13, 6.2.5.13, and 6.2.6.3.13</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision.</p>	Stephanie Howard	11/20/20
Ground: PI	Water: Groundwater Quality	Leasing will not affect groundwater, but potential exists for future groundwater effects including water	Garrett Manion	11/23/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		consumption from strip mining if developed.		
PI	Water: Hydrologic Conditions (stormwater)	No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. Surface disturbance by the actual tar sand extraction would alter surface water flow patterns and potentially impact storm water required for analysis as required by Section 402 of the Clean Water Act.	Jerrad Goodell	11/24/20
NP	Water: Municipal Watershed / Drinking Water Source Protection	Per review of GIS data, proposed leasing areas are not within or near any Drinking Water Source Protection Zones (DWSPZ). Leasing will not disturb any known sources for a municipal watershed area.	Garrett Manion	11/23/20
PI	Water: Steams, Riparian Wetlands, Floodplains	No riparian or wetland habitat is present or near the project area. This is known by personal knowledge and Field Office GIS data inventory.  No HUD inventoried floodplains are present or near the parcels that are considered for leasing. Non-HUD inventoried floodplains are not present. The parcel is located only in the upper region of drainage systems and the drainage systems would not present a conflict with development. Site specific operations of the tar sand extraction may indicate some disturbance to these upper drainages.	Jerrad Goodell	11/24/20
Surface: PI	Water: Surface Water Quality	Surface water: Perennial waters are not located at or near the project area. Potential of impacts to surface water from disturbance and potential chemical contamination could occur under the proposed action assumptions. Mainly through potentially increasing the velocity, sedimentation, and depositional rates when flood events occur in the area.	Stephanie Howard	11/30/20
NI	Water: Water Rights	There are 2 water rights in the proposed lease area #45-2882, and	Jerrad Goodell	11/24/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		#45-2937 both are BLM water rights for livestock to drink from intermittent stream channels. The impacts are adequately addressed in the surface water quality section of this document, therefore detailed analysis is not required.		
NP	Water: Waters of the U.S.	Waters of the U.S. are not present per the definition outlined in the June 22, 2020 Navigable Waters Protection rule. The project area contains only minor upland ephemeral drainages.	Jerrad Goodell	11/24/2020
NP	Wild Horses	None present as per Vernal RMP GIS data.	Stephanie Howard	11/20/20
PI	Wildlife: Migratory Birds (including raptors)	<p>Migratory birds (passerines, Partners in Flight species, etc.) are present (see <b>Appendix B</b>). Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions may be applied minimize or eliminate potential impacts from any future mine development.</p> <p>Four known golden eagle nests are within 0.5 mile of the parcels, two of which are located in the parcel (section 31 T4S R21E) and approximately 350 feet away from the vein. Burrowing owl nesting habitat is present on all parcels except those found in section 30 and 31 of T4S R21E. Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development.</p>	Iain Emmons	12/2/20
NI	Wildlife: Fish (designated or non-designated)	The parcel is less than 5 miles from the Green River, which is habitat for four endangered and three special status fish species. Designated critical habitat also	Jerrad Goodell	11/24/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>exists within the Green River. No impacts are anticipated beyond those previously disclosed in the 2012 PEIS. The analysis in <b>2012 PEIS section 5.8, Tables 6.2.1-9 (special status fish) and 6.2.1-10 (listed fish and critical habitat), and sections 6.2.2.7.1 and 6.2.6.3.7</b> is determined to be sufficient disclosure of potential future development activities for the purposes of this leasing decision. The Vernal RMP included consultation on the effects from tar sands leasing. This proposal falls within the scope of that consultation. See Chapter 5 of the EA.</p> <p>The following lease notice would be sufficient to protect the resource:</p> <p><b>ENDANGERED SPECIES ACT STIPULATION</b></p> <p>The lease may now and hereafter contain plants, animals, and their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objectives to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modification to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligation under</p>		

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		requirements of the Endangered Species Act as amended, 16 U. S. C. § 1531 et seq. including completion of any required procedure for conference or consultation.		
PI	Wildlife: Non-USFWS Designated	<p>All parcels are in sage grouse brooding and/or wintering habitat. The closest lek is approximately 0.25 miles. Site specific NEPA analysis will be required when a proposal for development is submitted. At development stage the ARMPA management decisions will be implemented.</p> <p>Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development to sage grouse</p> <p>Mule deer year-long crucial habitat including summer fawning habitat and winter range habitat designated by the Utah Division of Wildlife Resources (UDWR) is present within the east side of three parcels (section 31 T4S R21E and sections 5, 15, and 23 T5S R21E), and overlaps with veins in two parcels (section 31 T4S R21E and section 5 T5S R21E). Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or eliminate potential impacts from mine development.</p> <p>One white-tailed prairie dog colony is within 0.25 miles of one parcel and associated vein (sec 5 T5S R21E). Application of the identified lease notice(s) or stipulations(s) would be adequate for the leasing stage to disclose restrictions to minimize or</p>	Iain Emmons	11/24/20

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		eliminate potential impacts from mine development.		
NP	Wildlife: Threatened, Endangered, Proposed or Candidate	Per review of BLM District files and GIS data no threatened, endangered, proposed, or candidate terrestrial wildlife are identified within or near the proposed project area.	Iain Emmons	12/2/20
NI	Woodlands/ Forestry	The vegetation types within all of the parcels include 656 acres of pinyon juniper/sagebrush. Surface mining could result in disturbance to this community. Due to the small and sparse nature of the juniper in the project area, there is no forest product value, therefore any impacts to woodlands is included in <b>sections 3.1.7, 4.2.7, and 4.4.7.</b>	David Palmer	12/2/20

**Appendix Table A-2 Final Review**

Reviewer Title	Signature	Date	Comments
Environmental Coordinator	<i>/s/Daniel Kauffman</i>		
Authorized Officer	<b>X</b>		
	Kent Hoffman Deputy State Director Lands and Minerals		

## APPENDIX B: Threatened, Endangered, Candidate and Utah Special Status Animal Species

**Appendix Table B-1. Threatened, Endangered, Candidate and Utah Special Status Animal Species**

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Bonytail ( <i>Gila elegans</i> )	FE	Colorado River system.	None. This species occurs in the Green River. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Colorado pikeminnow ( <i>Ptychocheilus lucius</i> )	FE	Colorado River system.	None. This species occurs in the Green and White Rivers. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Humpback chub ( <i>Gila cypha</i> )	FE	Colorado River system.	None. This species occurs in the Green River. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Razorback sucker ( <i>Xyrauchen texanus</i> )	FE	Colorado River system.	None. This species occurs in the Green and White Rivers. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Black-footed ferret ( <i>Mustela nigripes</i> )	FE	Semi-arid grasslands and mountain basins. Distribution of this species is limited to a nonessential experimental population reintroduced into Coyote Basin, Uintah County starting in 1999.	None. The distribution of this species is limited to a nonessential experimental population reintroduced into Coyote Basin, Uintah County starting in 1999. Habitat is not present within the proposed project area.
Canada Lynx ( <i>Lynx lynx Canadensis</i> )	FT	Primarily occurs in Douglas-fir, Spruce-fir, and subalpine forests at elevations above 7,800 feet amsl.	None. If extant in Utah, this species most likely occurs in montane forests in the Uinta Mountains. Habitat is not present within the proposed project area.



Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	FT; PIF	In Utah, the species is primarily found in mesic (moister/cooler) canyons with mixed conifer or riparian components.	None. The habitat has been surveyed and determined unsuitable for nesting (SWCA Environmental Consultants, 2005)
Western, yellow-billed cuckoo ( <i>Coccyzus americanus occidentalis</i> )	FC; PIF	Riparian; large tracts of cottonwood/willow habitats; Lowland deciduous woodlands, alder thickets, deserted farmlands, and orchards.	None. Species is known to occur along the Green River and the Ouray National Wildlife Refuge. Habitat is not present within the proposed project area.
Greater Sage-grouse ( <i>Centrocercus urophasianus</i> )	FC; PIF	Inhabits foothills, plains, mountain slopes, and other upland habitats dominated by sagebrush communities.	High. The species is widespread, but declining, with extant populations in Uintah and Duchesne counties. Habitat is present within the proposed project area.
Bluehead sucker ( <i>Catostomus discobolus</i> )	CAS	Colorado River system.	None. The Bluehead sucker is native in parts of Utah. The species occurs in the upper Colorado River system. Habitat is not present within the proposed project area.
Flannelmouth sucker ( <i>Catostomus latipinnis</i> )	CAS	Colorado River system.	None. The Flannelmouth sucker is native in Utah. The species occurs in the Colorado River system. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Roundtail chub ( <i>Gila robusta</i> )	CAS	Colorado River system.	None. The Roundtail chub is native in Utah. The species occurs in the Colorado River system. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Colorado River Cutthroat trout ( <i>Oncorhynchus clarkii pleuriticus</i> )	CAS	Cool, clear water and well-vegetated stream systems; thrives at high elevations. Occurs also in lakes/reservoirs.	None. Habitat is not present within the proposed project area. The project is within 5 miles of the Green River.
Northern Goshawk ( <i>Accipiter gentilis</i> )	CAS	Deciduous, coniferous, and mixed forests. Typically, mature, and old growth forests and generally selects larger tracts of forest over smaller tracts.	None. Prefers old-growth forests near or within large drainage systems. Habitat is not present within the proposed project area.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	WSC	Bays, rivers, lakes/reservoirs that reflect the general availability of primary food sources. Roosts are typically deciduous, coniferous, or other sheltered sites in winter.	None. Bald eagles utilize ungulate winter ranges that provide carrion, and areas of open water such as the Green River. Roosting habitat does not occur within the proposed project area.
American white pelican ( <i>Pelecanus erythrorhynchos</i> )	WSC; PIF	Riparian areas with open water including large rivers, lakes/reservoirs, and ponds.	None. Known to nest on islands associated with Great Salt and Utah Lakes. In northeastern Utah, the species occurs as a transient on larger water bodies. Habitat is not present within the proposed project area.
Ferruginous hawk ( <i>Buteo regalis</i> )	WSC; PIF	Open country, plains, badlands; sagebrush, saltbush-greasewood shrubland, pinyon-juniper and other woodland, desert.	Moderate. This species is known to occur in the West Desert and the Uinta Basin as a summer resident and a common migrant. Within the Uinta Basin, the species is more associated with prairie dog colonies as the main prey base. No known or documented ferruginous hawk nests are within ½ mile of the proposed project well.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Burrowing owl ( <i>Athene cunicularia</i> )	WSC	Desert, semi-desert shrubland, grasslands, and agriculture areas. Nesting consists of flat, dry, and open terrain; short vegetation; and mammal burrows (within northeastern Utah primarily in association with prairie dog complexes) for nesting and shelter.	Moderate. Known to occur in Uintah and Duchesne counties. Nesting habitat is present within the proposed project area.
Mountain plover ( <i>Charadrius montanus</i> )	WSC; PIF	Shrub-steppe habitat where vegetation is sparse and sagebrush communities are dominated by <i>Artemisia</i> spp. with components of black sage and grasses. Only known breeding population is located in the Myton Bench area.	None. The only known breeding population of mountain plover in Utah is located on Myton Bench. Habitat is not present within the proposed project area.
White-tailed prairie dog ( <i>Cynomys leucurus</i> )	WSC	Inhabits grasslands, plateaus, plains, and desert shrub habitats.	High. Prairie dogs are an obligate species to several other state-sensitive species, such as ferruginous hawk, mountain plover, and burrowing owl, in that these species depend on them for food, shelter, and nesting habitat or habitat manipulation. Habitat is present within the proposed project area.
Short-eared owl ( <i>Asio flammeus</i> )	WSC	Inhabits arid grasslands, agricultural areas, marshes, and occasionally open woodlands. In Utah, cold desert shrub and sagebrush-rabbit brush habitats also are utilized.	None. Known to occur in Uintah County, with occurrence probable in Duchesne County. Habitat is not present within the proposed project area.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Lewis's Woodpecker ( <i>Melanerpes lewis</i> )	WSC; PIF	Pine forests, riparian, agriculture, and pinion-juniper woodlands.	Low. In Utah, the species is widespread, but is an uncommon nester along the Green River. Breeding by this species has been observed in Ouray and Uintah counties, and along Pariette Wash. Habitat is poor within the proposed project area.
Three-toed Woodpecker ( <i>Picoides tridactylus</i> )	WSC; PIF	Prefers coniferous forest, primarily spruce and balsam fir.	None. In Utah, the species is widespread, but no habitat exists within the Project area. The Three-toed woodpecker is associated more with spruce trees and not pinion pine or Doug-fir. Habitat is not present within the proposed project area.
Grasshopper sparrow ( <i>Ammodramus savannarum</i> )	WSC; PIF	Grasslands of intermediate height associated with clumped vegetation and patches of bare ground; other requirements include moderately deep litter and sparse coverage of woody vegetation.	Low. In Utah, the species is widespread and has been known to breed in Uintah, Duchesne, and Daggett counties. Habitat is present within the proposed project area.
Long-billed Curlew ( <i>Numenius americanus</i> )	WSC; PIF	Shortgrass prairies, alpine meadows, riparian woodlands, and reservoir habitats.	None. Widespread migrant in Utah. Breeding birds are fairly common but localized, primarily in central and northwestern Utah. Potential nesting has been reported in Uintah County, but has not been confirmed. Habitat is not present within the proposed project area.
Bobolink ( <i>Dolichonyx oryzivorus</i> )	WSC; PIF	Mesic and irrigated meadows, riparian woodlands, and subalpine marshes at lower elevations (2,800 to 5,000 feet amsl).	None. The species breeds in isolated areas of Utah, primarily in the northern half of the state. Breeding and winter habitat have been documented throughout Uintah, Duchesne, and Daggett counties. Habitat is not present within the proposed project area.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Big free-tailed bat ( <i>Nyctinomops macrotis</i> )	WSC	Rocky areas in rugged country; lowlands of river floodplain-arroyo association; shrub desert and woodland habitats.	None. The species has been documented in northeastern part of the state from Daggett County into Wyoming. Habitat for this species is not present within the proposed project area.
Fringed myotis ( <i>Myotis thysanodes</i> )	WSC	Caves, mines, and buildings, most often in desert and woodland areas.	None. High value and substantial value habitat exists for the species in southern Utah in lower elevations; however, the species has had a couple documented sightings along the White River. Habitat is not present within the proposed project area.
Spotted bat ( <i>Euderma maculatum</i> )	WSC	Desert shrub, sagebrush-rabbit brush, pinion-juniper woodland, and ponderosa pine and montane forest habitats; lowland riparian and montane grassland habitats.	None. The species potentially occurs throughout Utah; however, no occurrence records exist for the extreme northern or western parts of the state. Known occurrences have been reported in northeastern Uintah County. Habitat is not present within the proposed project area.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	WSC	Semidesert shrublands and pinion-juniper woodlands to open mountain forests.	Low. The species occurs throughout much of Utah including Duchesne and Uintah counties. One individual was collected at the Ouray National Wildlife Refuge in 1980. Roosting habitat for this species potentially could occur in areas where rock cliffs and caves are present. Habitat is not present within the proposed project area.
Western (Boreal) toad ( <i>Bufo boreas</i> )	WSC	Slow moving streams, wetlands, desert springs, ponds, lakes/reservoirs, and meadows.	None. The species is commonly spread throughout central and northern Utah. The only known occurrence in the Basin exists within the northwest portion of Uintah County which has substantial value habitat for the species. Habitat is not present within the proposed project area.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Corn snake ( <i>Elaphe guttata</i> )	WSC	Habitat includes pine woodlands, brushy fields, open hardwood forests, mangrove thickets, barnyards, and abandoned buildings, areas near springs, old trash dumps, and caves.	None. Occurs in Uintah County. The species have been identified at Ouray National Wildlife Refuge. Habitat is not present within the proposed project area.
Smooth green snake ( <i>Opheodrys vernalis</i> )	WSC	Meadows, grassy marshes, moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open moist woodland, abandoned farmland, and vacant lots.	None. Although not commonly seen throughout Utah the species has been documented in the northern section of Uintah County in lower elevations. Habitat is not present within the proposed project area.
Prairie falcon ( <i>Falco mexicanus</i> )	PIF	Alpine, cliff, cropland/hedge row, desert, and grassland/herbaceous areas.	None. Habitat is not present within the proposed project area.
Swainson's hawk ( <i>Buteo swainsonii</i> )	PIF	Grasslands, deserts, agricultural areas, shrublands, marshlands, and riparian forests.	None. Habitat is not present within the proposed project area.
Black-chinned hummingbird ( <i>Archilochus alexandri</i> )	PIF	Dry lowlands and foothills with pinion-juniper woodlands.	None. Habitat is not present within the proposed project area.
Broad-tailed hummingbird ( <i>Selasphorus platycercus</i> )	PIF	Open woodland, pinion-juniper, pine-oak, and conifer-aspen; brushy hillsides; montane scrub and thickets.	Moderate. Habitat is present within the proposed project area.
Brewer's sparrow ( <i>Spizella breweri</i> )	PIF	Desert and shrubland/chaparral.	Moderate. Habitat is present within the proposed project area.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Cassin's finch ( <i>Carpodacus cassinii</i> )	PIF	Open coniferous forest; in migration and winter also in deciduous woodland, secondary growth, scrub, brushy areas, partly open situations with scattered trees.	None. Habitat is not present within the proposed project area.
Cassin's kingbird ( <i>Tyrannus vociferans</i> )	PIF	Sparse woods and dry scrub areas.	None. Habitat is not present within the proposed project area.
Clark's nutcracker ( <i>Nucifraga columbiana</i> )	PIF	Open coniferous forest, forest edge and clearings, primarily in mountains, but wandering into various habitats; in winter also in lowlands.	None. Habitat is not present within the proposed project area.
Gray flycatcher ( <i>Empidonax wrightii</i> )	PIF	Arid areas of sagebrush or pinion-juniper woodlands.	None. Habitat is present within the proposed project area.
Gray vireo ( <i>Vireo vicinior</i> )	PIF	Dry shrubby areas, chaparral, and sparse woodlands.	Moderate. Habitat is present within the proposed project area.
Green-tailed towhee ( <i>Pipilo chlorurus</i> )	PIF	Low shrubs, open pinion-juniper woodlands.	Moderate. Habitat is present within the proposed project area.
Juniper titmouse ( <i>Parus inornatus</i> )	PIF	Sparse pinion-juniper and oak woodlands.	Moderate. Habitat is present within the proposed project area.
Mountain bluebird ( <i>Sialia currucoides</i> )	PIF	Subalpine meadows, grasslands, shrub-steppe, savanna, and pinion-juniper woodlands.	High. Habitat is present within the proposed project area.
Pinion jay ( <i>Gymnorhinus cyanocephalus</i> )	PIF	Semi-arid foothills with pinion-juniper woodlands.	Moderate. Habitat is not present within the proposed project area.
Sage sparrow ( <i>Amphispiza belli</i> )	PIF	Dry sagebrush/scrublands with sparse vegetation.	High. Habitat is present within the proposed project area.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	PIF	Desert and shrubland/chaparral.	High. Habitat is present within the proposed project area.

Species	Status	Habitat Association	Potential for Occurrence Within the Proposed Project area and Cumulative Effects Area
Virginia's warbler ( <i>Vermivora virginiae</i> )	PIF	Dry woodlands, scrub oak brushlands, canyons and ravines.	None. Habitat is not present within the proposed project area.
White-throated swift ( <i>Aeronautes saxatalis</i> )	PIF	Cliffs, canyons, and ravines.	None. Habitat is not present within the proposed project area.
Wilson's phalarope ( <i>Phalaropus tricolor</i> )	PIF	Grassland/herbaceous riparian and wetlands.	None. Habitat is not present within the proposed project area.

Federally Listed Species:

- FE = Federally listed as endangered;
- FT = Federally listed as threatened; and
- FC = Federally listed as candidate

BLM/State Sensitive Species:

- CAS = State Conservation Agreement Species; and
- WSC = Wildlife Species of Concern

PIF = Partners in Flight species of concern, Colorado Plateau, Utah Mountains, potentially in the Vernal Field Office.



## APPENDIX C: Threatened, Endangered, Candidate, Utah Special Status Plant Species

**Appendix Table C-1. Threatened, Endangered, Candidate, Utah Special Status Plant Species**

SPECIES	STATUS	HABITAT	POTENTIAL FOR AND/OR OCCURRENCE
<i>Aquilegia atwoodii</i> Atwood's columbine	Sensitive	Population is limited to Firewater Canyon tributary to Desolation Canyon at 4800 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Aquilegia scopulorum</i> var. <i>goodrichii</i> Goodrich's columbine	Sensitive	Green River shale ridges in association with Bristle cone pine, limber pine, Salina wildrye, mountain mahogany, pinyon, and Douglas fir communities. 7,400-9400 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Arabis vivariensis</i> park rock cress	Sensitive	Sandstone and limestone outcrops in mixed desert shrub and pinyon-juniper communities. 5000-6000 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Astragalus equisolensis</i> horseshoe milkvetch	Sensitive	Duchesne River Formation in sagebrush, shadscale, horsebrush and other mixed desert shrub communities. 4800-5200 ft.	Low – All known populations of this species are located south of the proposed parcels, but a small portion of the potential habitat polygon is located within one of the parcels.
<i>Astragalus hamiltonii</i> Hamilton milkvetch	Sensitive	Duchesne River, Wasatch, and less commonly Mowry Shale, Dakota and other formations in pinyon-juniper and desert shrub communities. 530-6200 ft	Moderate – Potential habitat for the species is present within the lease parcels, but no plants are known within the parcels per GIS review. However, there are known plants in the general area.
<i>Cleomella hillmanii</i> var. <i>goodrichii</i> Goodrich's stickweed	Sensitive	Mancos Shale, Tropic Shale and Morrison formations. On eroded slopes of heavy clay in salt desert communities. 4000-6000 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Cryptantha barnebyi</i> Barneby's catseye	Sensitive	White semi-barren shale knolls of the Green River Formation in shadscale, rabbitbrush, sagebrush, and pinyon-juniper communities. 6000-7900 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Erigeron untermannii</i> Untermann fleabane	Sensitive	Calcareous shales and sandstones of the Uinta and Green River formations in	None – No populations, potential or suitable habitat occurs for this species in this area.

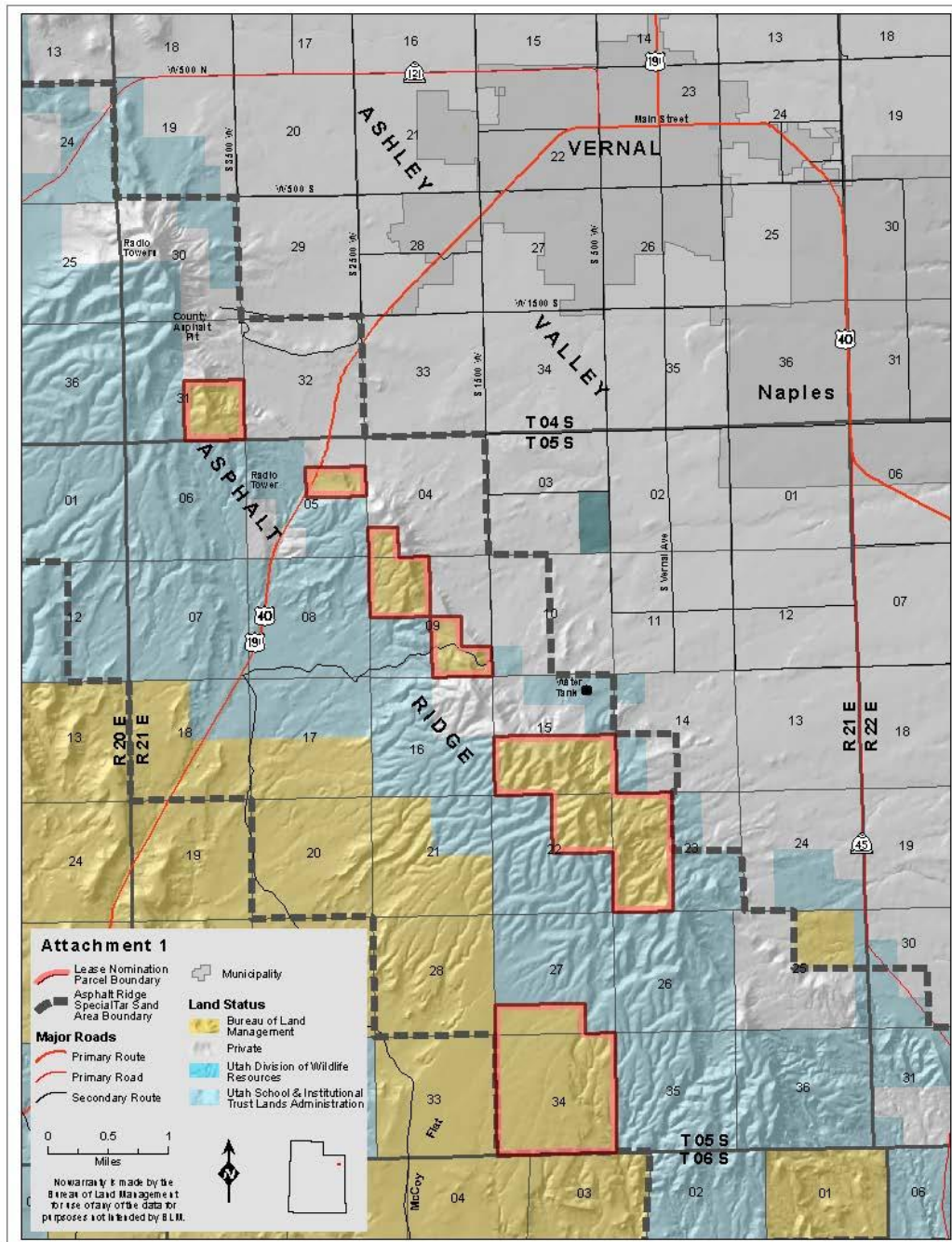
		pinyon-juniper, mountain mahogany, limber and bristlecone pine, and sagebrush communities. 7000-9400 ft.	
<i>Frasera ackermaniae</i> Ackerman's frasera	Sensitive	Semibarren yellowish clay soils of the Chinle and Nugget formations in pinyon-juniper and desert shrub communities. 5000-6000 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Hymenoxys lapidicola</i> Rock bitterweed	Sensitive	Pinyon-juniper and ponderosa pine-manzanita communities, often in rock crevices. 6000-8100 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Lepidium barnebyanum</i> Barneby's ridgecress	Endangered	White Shale outcrops mainly on ridge crests. 6200-6500 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Lepidium huberi</i> Huber pepperplant	Sensitive	Sand or silty sands derived from the Chinle formation, and on the Park City and Weber Sandstone formations in sagebrush, snowberry, mountain mahogany, ponderosa pine, Douglas fir, lodgepole pine, and spruce-fir communities. 7300-9700 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Mentzelia goodrichii</i> Goodrich blazingstar	Sensitive	Steep, white, marly calciferous shale outcrops of the Green River formation with scattered limber pine, pinyon pine, Douglas fir, mountain mahogany, and rabbitbrush. 8100-8800 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Oenothera acutissima</i> Large yellow evening primrose, Flaming Gorge evening primrose	Sensitive	Endemic to the east Uinta Mountains, Blue Mountain, Cold Spring Mountain, and Yampa Plateau in sandy, summer-dry stream beds, dry rocky meadows, and rocky areas adjacent to streams; ponderosa pine and mountain big sagebrush communities. 7,000 – 8,355 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Penstemon acaulis</i> var. <i>acaulis</i> stemless penstemon	Sensitive	Semi-barren substrates in pinyon-juniper and sagebrush-grass communities. 5900-8200 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.

<i>Penstemon gibbensii</i> Gibben's penstemon	Sensitive	Shaly slopes and bluffs with mixed desert shrubs and scattered juniper 5500-5600 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Penstemon goodrichii</i> Goodrich's penstemon	Sensitive	Blue gray to reddish, clay-impregnated badlands of the Duchesne River Formation in shadscale and juniper-mountain mahogany communities 5600- 6205ft.	Low – Potential habitat for the species is present within the lease parcels, but no plants are known per GIS review.
<i>Penstemon grahamii</i> Graham beardtongue	Proposed	Shale ledges and talus of the Green River Formation growing in sparsely vegetated shadscale, <i>Eriogonum</i> , horsebrush, ryegrass, and pinyon-juniper communities. 4600-6800 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Penstemon scariosus</i> var. <i>albifluvis</i> White River penstemon	Candidate	Sparsely vegetated pale tan, shale slopes of the Green River formation in shadscale, rabbitbrush, ricegrass, ryegrass, sagebrush, Barneby's thistle, and pinyon-juniper communities. 5000-6800 ft	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Phacelia argylensis</i> Argyle Canyon phacelia	Sensitive	Sandy-silty soil in wash bottoms on the Green River shale in pinyon-juniper, serviceberry, and Douglas Fir communities. Around 7600 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Schoenocrambe argillacea</i> Clay thelopody	Threatened	On the lower Uinta and upper Green River formations in shadscale, Indian ricegrass, pygmy sagebrush, and other mixed desert shrub communities. 4800-5600 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Schoenocrambe suffrutescens</i> Shrubby reed-mustard	Endangered	Calcareous shale of the Green River formation in shadscale, pygmy sagebrush, mountain mahogany, juniper, and mixed desert shrub communities. 5400-6000ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Sclerocactus brevispinus</i> Uinta Basin hookless cactus	Threatened	Pediment gravels (desert pavement) over Uinta Formation within Parriette Draw, Castle Peak Draw, and the surrounding benches. Growing in association with shadscale and sagebrush. 4700-5200ft.	None – No populations, potential or suitable habitat occurs for this species in this area.

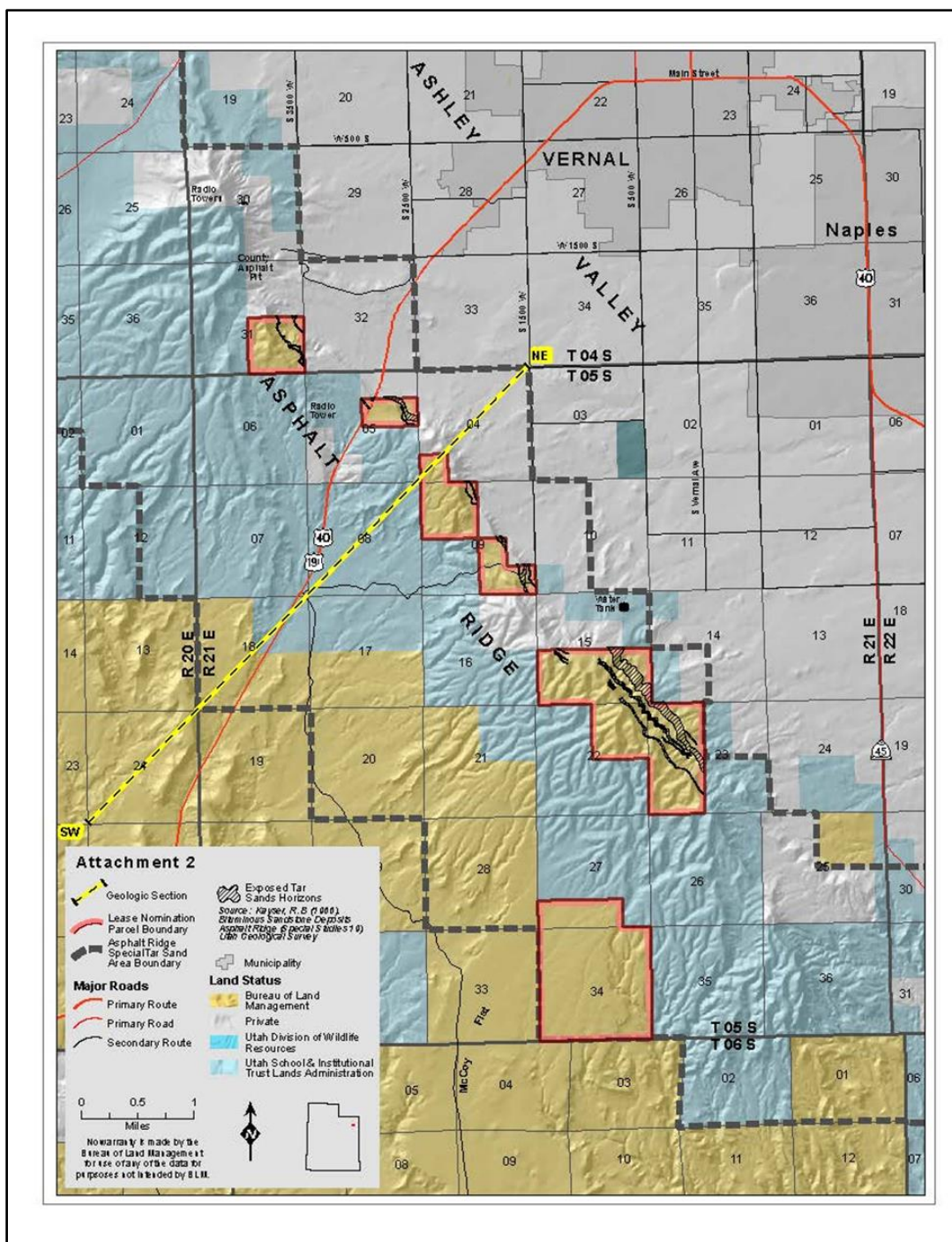
<i>Sclerocactus wetlandicus</i> Uinta Basin hookless cactus	Threatened	Typically, gravelly terraces and benchlands. Also found in locations with desert pavement, shale outcrops, and mudstone deposits. 4500-6000ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Spiranthes diluvialis</i> Ute lady's tresses	Threatened	Wet meadows, stream banks, abandoned oxbow meanders, marshes, and raised bogs. 4500-6850ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Thelesperma caespitosum</i> Uinta greenthread	Sensitive	White shale benches and windswept slopes of the Green River and Uinta formation with pinyon and mountain mahogany. 5900-8400 ft.	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Townsendia strigosa</i> var. <i>prolix</i> Strigose Townsendia	Sensitive	Mixed desert shrub communities	None – No populations, potential or suitable habitat occurs for this species in this area.
<i>Yucca sterilis</i> Sterile yucca	Sensitive	Salt and mixed desert shrub communities growing in sandy soils. 4800-5800 ft.	Potential habitat for the species is present within the lease parcels

Habitat information including elevations is referenced as per A Utah Flora: 3<sup>rd</sup> edition or from survey data. Additional survey efforts may alter the suitable habitat descriptions in the future.

## APPENDIX D: Maps

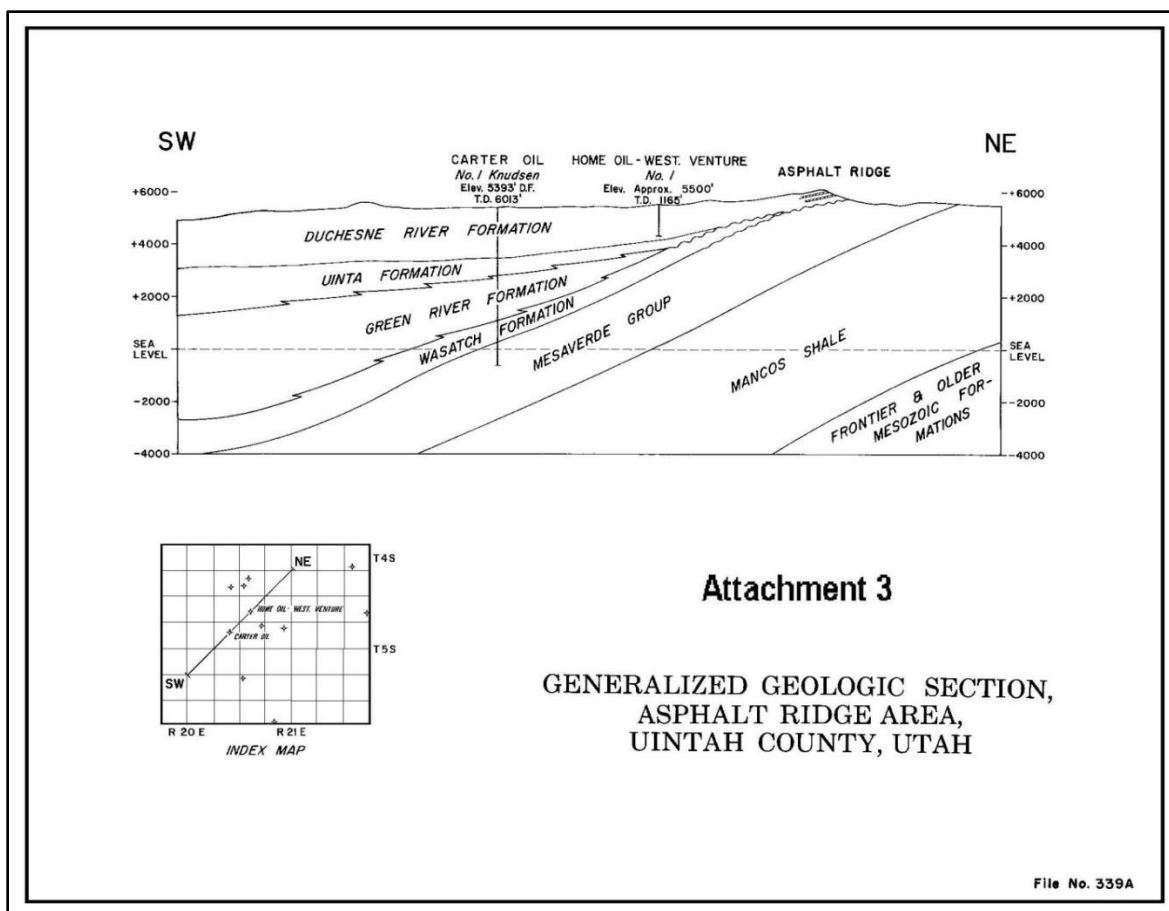


Appendix Figure D-1. Lease Parcel Nomination

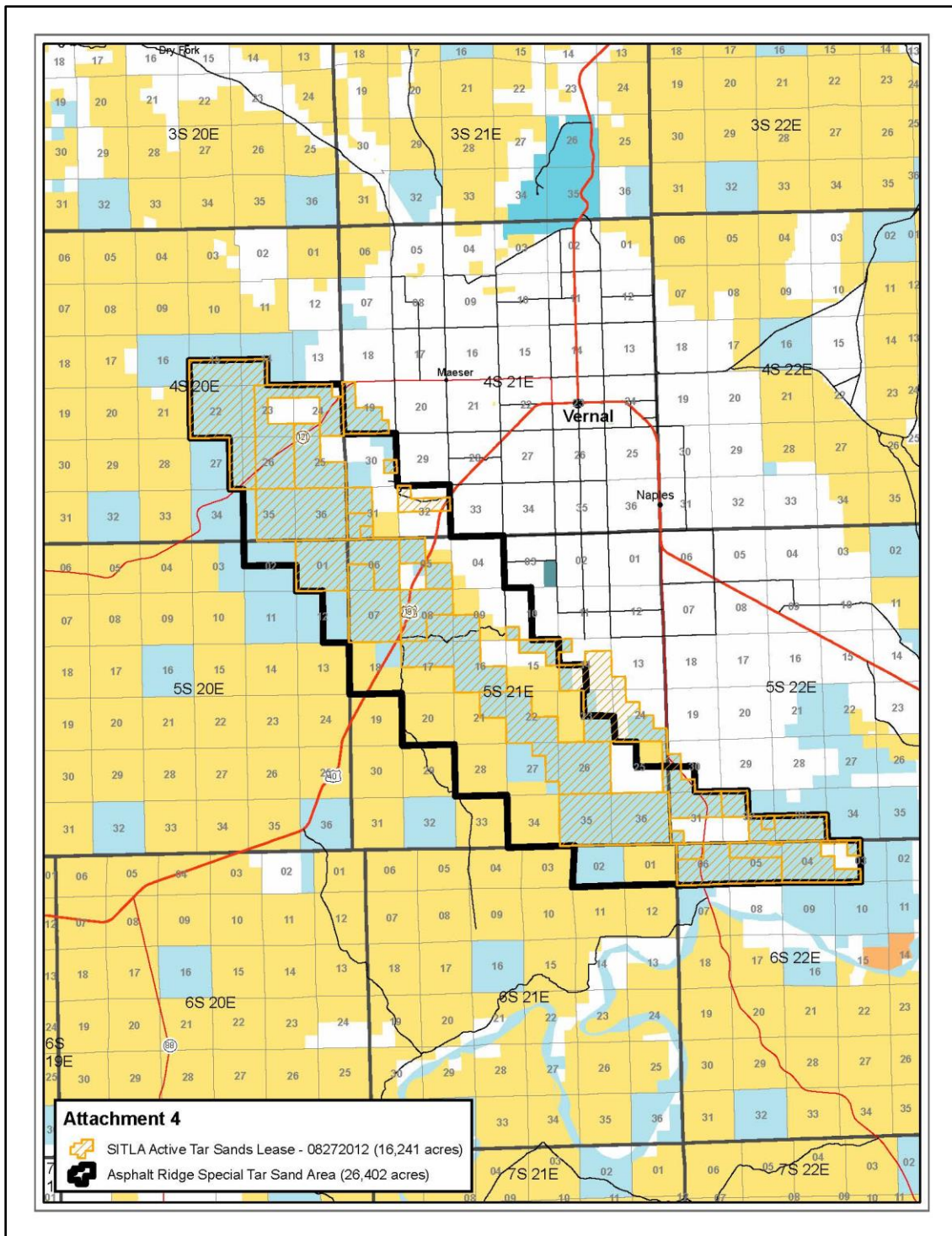


Appendix Figure D-2. Geologic Cross Section Location





**Appendix Figure D-3. Asphalt Ridge Geologic Cross Section**



**Appendix Figure D-4. Partial -Asphalt Ridge Special Tar Sand Area (STSA)**



## APPENDIX E: Preliminary Lease Including Stipulation and Notice Summary

T. 4 S., R. 21 E., SLM, Utah

Sec. 31, N½SE¼, Sec. 31, S½SE¼;

T. 5 S., R. 21 E., SLM, Utah

Sec. 4, SW¼SW¼;

Sec. 5, lot 5, SW¼NE¼;

Sec. 9, lots 1 and 2, W½NW¼, W½SE¼, SE¼SE¼;

Sec. 15, lots 1-8;

Sec. 22, lots 1 and 2, S½NE¼;

Sec. 23, lots 4 and 5, S½NW¼, SW¼;

Sec. 27, S½SW¼, SW¼SE¼;

Sec. 34, all.

Containing approximately 2123 acres

Uintah County, Utah

Vernal Field Office

**Appendix Table E-1. Lease Stipulation Summary**

LEASE STIPULATION SUMMARY
<b>VISUAL RESOURCES CONTROLLED SURFACE USE STIPULATION</b> <b>(UT-S-157)</b> Visual resource management activities will comply with BLM Handbook 8410-1. Within VRM Class III areas, surface disturbing activities will partially retain the existing character of the landscape. The allowable level of change will be moderate, may attract attention, but should not dominate the view of the casual observer. Landscape changes should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. <b>Exception:</b> Exempted are recognized utility corridors. <b>Modification:</b> None <b>Waiver:</b> None

## LEASE STIPULATION SUMMARY

### TIMING LIMITATION – GREATER SAGE-GROUSE BROOD REARING AND NESTING (UT-S-205)

No surface-disturbing activities within 2 miles of active Greater Sage-Grouse leks found outside of Priority Habitat Management Areas (PHMA) within brood rearing and nesting habitat from **March 1 - June 15**.

**Exception:** None

**Modification:** None

**Waiver:** None

### SPECIAL STATUS SPECIES – RAPTORS (UT-S-261)

Raptor management would be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (VFO approved Resource Management Plan (RMP) and Record of Decision (ROD), Appendix A; October 2008), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses.

**Exception:** None

**Modification:** Criteria that would need to be met, prior to implementing modifications to the spatial and seasonal buffers in the “Raptor BMPs”, would include the following:

1. Completion of a site-specific assessment by a wildlife biologist or other qualified individual. See example (Attachment 1 of the Raptor BMPs in Appendix A)
2. Written documentation by the BLM Field Office Wildlife Biologist, identifying the proposed modification and affirming that implementation of the proposed modification(s) would not affect nest success or the suitability of the site for future nesting. Modification of the “BMPs” would not be recommended if it is determined that adverse impacts to nesting raptors would occur or that the suitability of the site for future nesting would be compromised.
3. Development of a monitoring and mitigation strategy by a BLM biologist, or other raptor biologist. Impacts of authorized activities would be documented to determine if the modifications were implemented as described in the environmental documentation or Conditions of Approval and were adequate to protect the nest site. Should adverse impacts be identified during monitoring of an activity, BLM would follow an appropriate course of action, which may include cessation or modification of activities that would avoid, minimize or mitigate the impact, or, with the approval of UDWR and the USFWS, BLM could allow the activity to continue while requiring monitoring to determine the full impact of the activity on the affected raptor nest. A monitoring report would be completed and forwarded to UDWR for incorporation into the Natural Heritage Program (NHP) raptor database.

**Waiver:** None

<b>LEASE STIPULATION SUMMARY</b>
<p align="center"><b>ENDANGERED SPECIES ACT STIPULATION</b></p> <p>The lease may now and hereafter contain plants, animals, and their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objectives to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modification to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligation under requirements of the Endangered Species Act as amended, 16 U. S. C. § 1531 et seq. including completion of any required procedure for conference or consultation.</p>
<p align="center"><b>CULTURAL RESOURCES</b></p> <p>This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.</p>

**Appendix Table E-2. Lease Notice Summary**

<b>LEASE NOTICE SUMMARY</b>
<p align="center"><b>MIGRATORY BIRDS (UT-LN-45)</b></p> <p>The lessee/operator is given notice that surveys for nesting migratory birds may be required during migratory bird breeding season whenever surface disturbances and/or occupancy is proposed within priority habitats. Surveys should focus on identified priority bird species in Utah. Field surveys will be conducted as determined by the Authorized Officer of the Bureau of Land Management. Based on the result of the field survey, the Authorized Officer would determine appropriate buffers and timing limitations.</p>

<b>LEASE NOTICE SUMMARY</b>
<p data-bbox="472 247 1052 279" style="text-align: center;"><b>UTAH SENSITIVE SPECIES (UT-LN-49)</b></p> <p data-bbox="203 302 1414 590">The lessee/operator is given notice that no surface use or otherwise disruptive activity would be allowed that would result in direct disturbance to populations or individual special status plant and animal species, including those listed on the BLM sensitive species list and the Utah sensitive species list. The lessee/operator is also given notice that lands in this parcel have been identified as containing potential habitat for species on the Utah Sensitive Species List. Modifications to the Surface Use Plan of Operations may be required in order to protect these resources from surface disturbing activities in accordance with Section 6 of the lease form terms, Endangered Species Act, Migratory Bird Treaty Act and 43 CFR 3101.1-2.</p>
<p data-bbox="354 625 1170 695" style="text-align: center;"><b>SPECIAL STATUS PLANTS: NOT FEDERALLY LISTED (UT-LN-51)</b></p> <p data-bbox="203 718 1414 892">The lessee/operator is given notice that lands in this lease have been identified as containing special status plants, not federally listed, and their habitats. Modifications to the Proposed Mine Plan may be required in order to protect the special status plants and/or habitat from surface disturbing activities in accordance with Section 6 of the lease form terms, Endangered Species Act, and 43 CFR 3101.1-2.</p>
<p data-bbox="266 932 1258 963" style="text-align: center;"><b>HIGH POTENTIAL PALEONTOLOGICAL RESOURCES (UT-LN-72)</b></p> <p data-bbox="203 987 1398 1230">The lessee/operator is given notice that lands in this lease have been identified as having high potential for paleontological resources. Planned projects should be consistent with BLM Manual and Handbook H8270-1, Chapter III (A) and III (B) to avoid areas where significant fossils are known or predicted to occur or to provide for other mitigation of possible adverse effects (RX, NF, ESR). Modifications to the Surface Use Plan of Operations may be required in order to protect paleontological resources from surface disturbing activities in accordance with Section 6 of the lease form terms and 43 CFR 3101.1-2.</p>
<p data-bbox="526 1257 1096 1289" style="text-align: center;"><b>AIR QUALITY ANALYSIS (UT-LN-102)</b></p> <p data-bbox="203 1312 1414 1522">The lessee/operator is given notice that prior to project-specific approval, additional air quality analyses may be required to comply with the National Environmental Policy Act, Federal Land Policy Management Act, and/or other applicable laws and regulations. Analyses may include dispersion modeling for deposition and visibility impacts analysis, control equipment determinations, and/or emission inventory development. These analyses may result in the imposition of additional project-specific air quality control measures.</p>
<p data-bbox="243 1562 1284 1593" style="text-align: center;"><b>GREATER SAGE-GROUSE – NET CONSERVATION GAIN (UT-LN-131)</b></p> <p data-bbox="203 1617 1317 1860">In Priority and General Habitat Management Areas (PHMA and GHMA) all actions that result in habitat loss and degradation will require mitigation that provides a net conservation gain to the Greater Sage-Grouse (GRSG). Mitigation must account for any uncertainty associated with the effectiveness of the mitigation and will be achieved through avoiding, minimizing, and compensating for impacts. Mitigation will be conducted according to the mitigation framework found in Appendix F in the 2015 Utah Approved Management Plan Amendment.</p>

<p align="center"><b>LEASE NOTICE SUMMARY</b></p>
<p align="center"><b>GREATER SAGE-GROUSE – REQUIRED DESIGN FEATURES (UT-LN-132)</b></p> <p>Apply the Required Design Features (RDF)* in Appendix C of the 2015 Utah Approved Management Plan Amendment when developing a lease in Priority and General Habitat Management Areas (PHMA and GHMA).</p> <p>*RDFs may not be required if it is demonstrated through the NEPA analysis that the RDF associated project/activity is:</p> <ul style="list-style-type: none"> <li>• Documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;</li> <li>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;</li> <li>• Provide no additional protection to GRSG or its habitat.</li> </ul>
<p align="center"><b>GREATER SAGE-GROUSE – BUFFER (UT-LN-133)</b></p> <p>In Priority and General Habitat Management Areas (PHMA and GHMA), the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B, Applying Lek-Buffer Distances, consistent with valid and existing rights and applicable law in authorizing management actions.</p>
<p align="center"><b>CADASTRAL MONUMENT STIPULATION</b></p> <p>If in the course of operations any monuments, corners, or accessories are destroyed, obliterated, or damaged by such operations, the operator shall immediately report the matter to the authorized officer. Any disturbed corner positions shall be remonumented, in their original and/or restored positions, in accordance with the standards and guidelines found in the Manual of Surveying Instructions, U.S. Department of Interior. The operator will pay for the remonumenting of any corners that are destroyed or obliterated or damaged. This work shall be conducted at the expense of the operator, by the BLM.</p>
<p align="center"><b>VRM CLASS III</b></p> <p>The lessee/operator is given notice that visual values and proposed actions will be evaluated to determine appropriate mitigations and conformance with Visual Resource Management Class III objectives.</p>

<b>LEASE NOTICE SUMMARY</b>
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<b>HIGHLINE CANAL</b>
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<p>The lessee/operator is given notice that lands in this lease have been identified as being in proximity to the Highline Canal. Modifications to the Proposed Mine Plan, including the implementation of Best Management Practices (BMPs), may be required in order to reduce erosion of sediment, selenium, and Total Dissolved Solids (TDS) into the canal and downstream perennial waters. The BMPs may include but are not limited to:</p>
--

- |   |
|---|
| <ul style="list-style-type: none"><li>• Maintain uncultivated buffer strips along the canal.</li><li>• Control soil erosion from canal banks and uplands.</li><li>• Place rock barbs or revetment to deflect runoff flow away from canal banks.</li></ul> |
|---|

## LEASE NOTICE SUMMARY

### WATER QUALITY BASELINE DATA

Adequate base line data and water impact analysis shall be established prior to conducting any surface disturbing activity. In order to accomplish this, the lessee shall submit for review and approval by the AO, a plan to analyze ground and surface water interactions as part of any operations or exploration on the lease. The plan shall be submitted prior to or concurrent with a Mining or Exploration plan under 43 CFR 3592.1. The water plan may contain but is not limited to:

- A reasonable data acquisition area surrounding the project, to include watersheds.
- Documentation of existing geohydrology.
- Identification of seeps, springs, wells, ponds, and alluvial and bedrock aquifers including:
  - Location, size or discharge quantity, and water quality including Utah Division of Environmental Quality Standards, in addition to stable isotopes as necessary; and
  - Identification of the sites, number of samples, and frequency of sampling for each site (seep, spring, well aquifer) to be taken in order to establish the baseline.
- Identification of existing water right holders and potential impacts to those holders.
- Identification of water balance including tailings management.
- Analysis of potential tailings leachate and migration.
- Creation of a surface and groundwater monitoring plan for water resources throughout and surrounding the operation and other sites including tailings.
  - Identification of effects to seeps, springs, wells, ponds, and alluvial and bedrock aquifers
- Identification of sample frequency and constituents to be monitored (quantity and quality -including those listed above).
- Identification of analyte thresholds
- Identification of the action to be taken if the analytes exceed the threshold or baseline concentrations
  - Identification of how the data will be stored and analyzed over time (Charts, Graphs, Text)
- Creation of a water replacement or treatment plan if the threshold limits (regulatory or baseline) have been exceeded for a water source containing <10,000 mg/l Total Dissolved Solids (TDS) that has been impacted in either quality or quantity which are identified in the plan.
  - Determine water quality and quantity
  - Water replacement mitigation or treatment method.
  - Type of analysis that determined water contamination

## **APPENDIX F: Tar Sand Operation Water Consumption Assumptions**

Tar sands (oil sands, oil impregnated sands) are comprised of basically bitumen and sand, or in laymen's terms tar and sand, with associated products. Most information about processing tar sands comes from Canada. The Canadian tar sands are "water wetted" versus the Utah tar sands which are "oil wetted". The basic difference is the water wetted sands have a film of water between the sand grains and bitumen and in the oil wetted sands there is no film, and the bitumen is bonded directly to the sand grain. Because of this difference, there is no direct correlation between the processing of Canadian tar sands and the Utah tar sands. Sepulveda and Miller from the University of Utah's Metallurgy and Metallurgical Engineering department stated "However, because of the significant differences in the physical and chemical nature of Canadian tar sands compared to Utah tar sands, and because of considerable differences in climatic conditions between the two locations, the separation technology to be developed for the processing of Utah tars sands and the technology already being used for the processing of Canadian tar sands are expected to be substantially different." (Sepulveda & Miller, 1979)

There were many processes developed for different tar sand deposits in the United States in the early 1980's. In 1981 there was a 20,000 bbl./day capacity plant designed for recovery of oil from a diatomaceous earth tar sands deposit near McKittrick, California (Daniels, 1981). Diatomaceous earth deposits are different than Utah Tar Sands (BLM, 2012b). There were plants designed in Kentucky and Texas. Very few if any of these plants were actually put into production (Daniels, 1981). In the spring of 1984 tests were conducted by Western Research Institute (University of Wyoming) on the Northwest Asphalt Ridge for thermal combustion and steam drive extraction techniques (In Situ). The recovery of bitumen was only 5% and the water recovery was only 10%. The water loss was due in part to a high permeable zone that was encountered and higher permeable under burden and most of the steam was lost due to these complications (Western Research Institute, 1985).

The processes used to extract the bitumen from sand will determine the amount of water that will be used. There are 2 basic types of recovery methods – Mining and Extraction and In Situ Extraction. If the lands are leased and a mining plan is submitted, then additional NEPA will be required to look at the specifics of the project. At the leasing stage it was assumed that the Mining and Extraction method would be utilized due to previous failed attempts on In Situ Extraction on Asphalt Ridge.

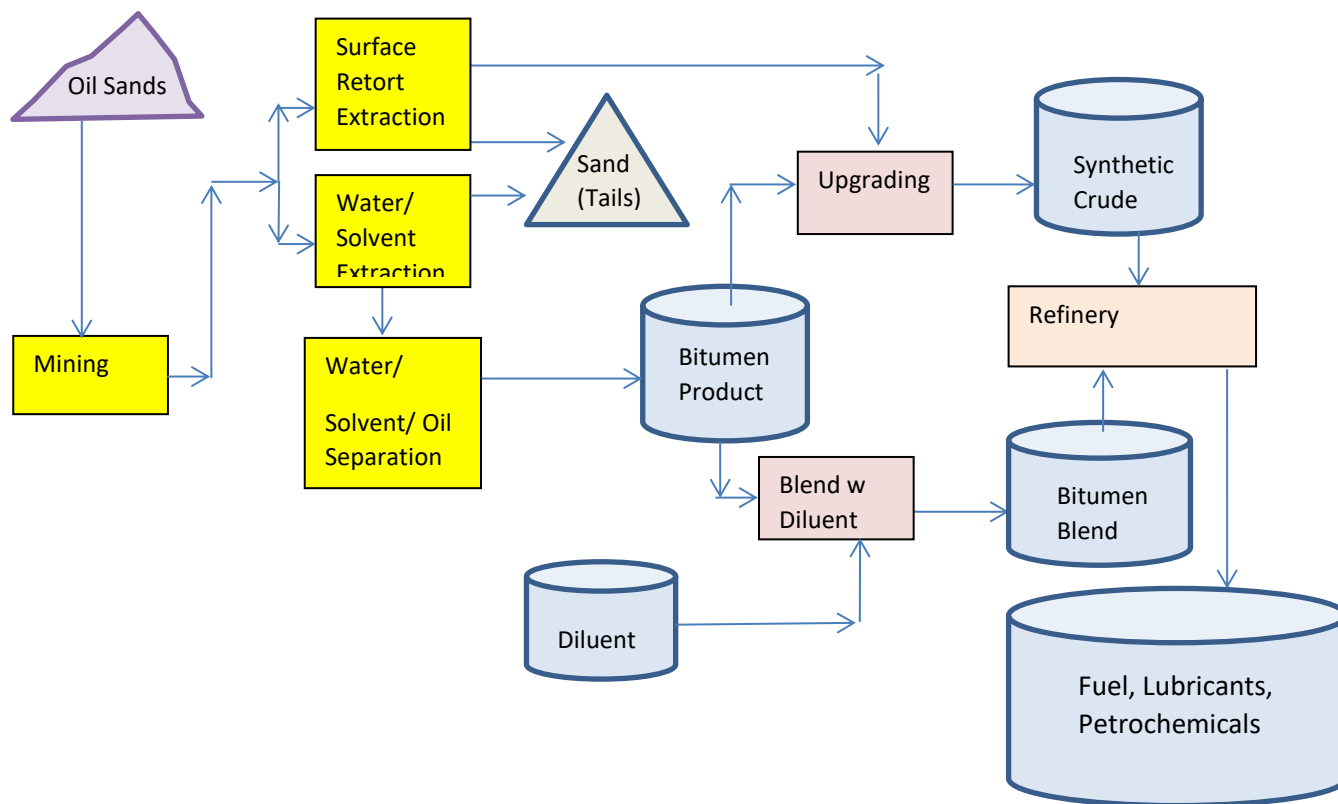
In 2012, a pilot plant (Mining and Extraction) went through a demonstration phase at Asphalt Ridge located about 2 miles from the parcel. The capacity of the plant was designed for 1,200 bbl. per day of bitumen. This is the only plant that has been built and operated for Utah tar sands and specifically Asphalt Ridge tar sands. The results have been included in this analysis because of the water requirements necessary to extract the bitumen in that process.

There are basically 3 steps to turn tars sands into consumer products such as gasoline and other products. These are

- Mining and Extraction
- Processing and Upgrading
- Refining



The following Tar Sand Mining and Processing Chart represent these major steps.



**Mining and Extraction:** The mining has been historically accomplished mainly by surface mining for deposits up to 250 feet deep. Underground mining may be utilized if applicable. Once the tar sand<sup>2</sup> material has been removed from the ground the bitumen must be removed from the rock. This can be accomplished by a number of different extraction methods which can include, 1) hot water modified extraction, 2) solvent extraction with water, 3) solvent extraction without water, 4) surface retorting.

**Processing/Upgrading:** These facilities remove carbon from and add hydrogen to bitumen<sup>3</sup>. The process to turn bitumen into synthetic crude<sup>4</sup> includes coking<sup>5</sup>, catalytic conversion,

<sup>2</sup> Tar Sand – Any consolidated or unconsolidated rock (other than coal, oil shale, or gilsonite that contains a hydro carbonaceous material and is produced by mining or quarrying) 34 CFR 3141.0-5(e).

<sup>3</sup> Bitumen- A highly viscous (very thick) hydrocarbon (petroleum-based substance) that is mainly found in deposits called “oil (tar) sand” and that can be extracted from the sand through a variety of processes. This is not to be confused with tar. Tar is a refined product. Bitumen is sometimes referred to as natural tar. (Encyclopaedia Britannica, 2017)

<sup>4</sup> Synthetic Crude – Syncrude is a product that is produced from bitumen which has been upgraded and the contaminants have been removed.

<sup>5</sup> Coking – Upgrades “bottom” or heavier products from vacuum distillation to a higher value product (Energy Information Administration, 2013).

hydrotreating<sup>6</sup> and distillation<sup>7</sup>. A diluent<sup>8</sup> may be added to the bitumen in order to lower the viscosity in order to make the bitumen flow in a pipe and be sent to a refinery for processing.

Refining: Refining produces gasoline, jet fuel, and other products from bitumen or synthetic crude.

Processing and refining will not be specifically discussed because the bitumen is usually sent off-site to these facilities for further processing. Some processes do end in the production of Syncrude and not bitumen. There can be minor additions to some processes to produce diesel fuel, asphalt, and vacuum gas oil (Coleman & Adams, 2004). If up grading or refining facilities are proposed on Federal lands in the operating plan, they will be covered in a subsequent NEPA analysis.

**Appendix Table F-1. Tar Sand Extraction Method and Water Usage**

Operation	Barrels of Water	Notes	Source
Surface Mining	0-0.4 bls per ton		(Daniels, 1981)
Asphalt Ridge Pilot Plant Modified Hot Water Extraction	The pilot plant required approximately 19 bbl. of water per 1 bbl. of bitumen produced. 0.88 bbl. of fresh makeup water per 1 bbl. of bitumen produced (plus some minor steam loss) was required for make-up.  Tailings not placed in a tailings pond because water was decanted and recycled, and the clays were filter dried and the tailing were considered “stackable” to be used for reclamation.	A tar sands process located on Asphalt Ridge designed for 1,200 bbl. per day.  Basis: 10% Bitumen ore and approximately 88% plant recovery.	Personal communication James Lekas, 2014  (Bureau of Land Management, 2012a)  (Coleman & Adams, 2004).
Solvent Extraction with Water	US Oil Sands - 1.5 bbs. of water “consumed” (not recycled) for every bbl. of bitumen produced.  DARVO Process 5 bbl. water to 1 bbl. of Syncrude does not require fresh water can use wastewater.	Solvent is projected to be recycled at 98% and water at 95%.	(US Oil Sands, 2016)  (Daniels, 1981)& BLM 2012b B-34
Solvent Extraction without Water	0 gallons of makeup water per gallon of Syncrude	Solvent cost and loss may make this uneconomical	BLM, 2012b

<sup>6</sup> Hydrotreating – A process that reduces sulfur and nitrogen and is reacted with hydrogen to upgrade the product (Shell Global, 2017)

<sup>7</sup> Distillation – Process to separate different petroleum products.

<sup>8</sup> Diluent - A light petroleum product which thins bitumen in order to facilitate pumping (Canadian Energy Pipeline Association, 2017).

<sup>8</sup> All barrels (water and product) are considered to be 42 gallons

Operation	Barrels of Water	Notes	Source
Surface Retort	0.58 gallons of fresh water per gallon of Syncrude produced		(Daniels, 1981) p. 37 and BLM 2012b Table B-7

## APPENDIX G: Regional and National Federal GHG Emissions

There are a variety of ways to project emissions forward in time for the purpose of analysis. The availability of data, the projection time frame, and the nature of the action itself will often dictate the appropriate methodology (and corresponding assumptions) to be used. For example, reasonably foreseeable development scenarios (RFDS) have been prepared by the BLM Reservoir Group to try to forecast oil and gas growth in specific BLM field offices for a known basin or play based on a number of factors (estimated hydrocarbon potential, operator surveys, existing development trends, economics forecasts, basic geology, etc.). These documents typically provide for 20+ years of estimated oil and gas development and have traditionally been used to inform Resource Management Plan (RMP) development (as assumptions for analysis). The RFD documents are not intended to be a resolute prediction of development pace, or indicative of any potential development limit. Given the dynamics of the industry and the global nature of the hydrocarbon commodities markets development in any single area does not exist in a vacuum and is subject to external influences that can render the best RFD outdated within a few years. As such, the BLM often find that these documents are unreliable predictors for the purposes of one-off air resource and GHG impact assessments and for determining prescriptive mitigation requirements over the entirety of a field office planning period.

For the purposes of this report the BLM is the fossil fuel energy projections made by the EIA for their Annual Energy Outlook (AEO) report for evaluating Federal emissions in the region and nationally. The Utah Division of Oil Gas and mining provides detailed information regarding drilling and production data which is used in estimating the baseline (**Table** ) and aggregate (**Error! Reference source not found.**) oil and gas emissions for the State of Utah. However, this information is not readily available for all states. Oil, gas, and coal production data is used to calculate Federal emissions for the region and nationally. While these emissions calculations are not as refined as the Utah baseline and aggregate emissions they do allow for a direct comparison of potential Federal emissions at the state, regional, and national levels. A 5-year average of production is used to smooth out potential annual variability that can arise for any number of reasons, not the least of which being the simple economics of energy supply and demand over any given period.

### Domestic Energy & Emissions

Domestic energy supplies of fossil fuel minerals can generally be classified as either federal or non-federal, where non-federal signifies state, local, private, or corporate ownership. The BLM manages the onshore federal mineral estate on behalf of the public and in accordance with numerous laws, regulations, and policies to provide for the nation's energy security and to help meet the demand for energy domestically and abroad. The data tables below show production and emissions data for each mineral type by region. All regions other than "U.S. Total" represent federal minerals only. The "Onshore" designation is used to account for all other onshore federal minerals produced in states not explicitly represented by the regions listed within the tables. The percent total and percent federal data columns in the production tables are based on the averages of the full five years of data presented.



**Table 3 Coal Production Trends (tons)**

<b>Region</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>% Total</b>	<b>% Federal</b>
U.S. Total	896940563	728364498	774609357	756167095	706309263	100%	NA
CO	17124505	10614645	10392779	10620675	10336903	1.53%	3.70%
MT	19063920	13884403	18023605	17626988	15631137	2.18%	5.28%
NM	7657220	4914843	5956595	1754306	3775959	0.62%	1.51%
ND	5261915	4738941	4348995	3849247	4039635	0.58%	1.39%
UT	11364222	12252873	12933852	11051690	12791486	1.56%	3.78%
WY	314632155	244846641	273653181	265503330	244041373	34.76%	84.14%
Onshore	636458	692831	764815	516732	543138	0.08%	0.20%

1 Federal coal accounts for 41.3% of all U.S. production on a 5-year annual average basis.

**Table 4 Natural Gas Production Trends (Mcf)**

<b>Region</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>% Total</b>	<b>% Federal</b>
U.S. Total	32,914,647,000	32,591,578,000	33,292,113,000	37,325,539,000	40,892,458,000	100%	NA
AK	16,642,097	14,663,058	16,039,628	15,315,663	18,449,816	0.05%	0.36%
CA	13,291,040	12,611,640	11,839,226	11,918,118	6,004,674	0.03%	0.25%
CO	664,983,322	626,680,566	644,465,321	637,440,829	664,233,004	1.83%	14.44%
MT	14,119,762	12,607,237	12,287,580	11,627,948	10,951,038	0.03%	0.27%
NM	800,540,964	786,765,900	799,943,219	920,956,001	1,046,481,774	2.46%	19.42%
ND	41,974,682	47,169,787	60,564,817	73,674,266	88,968,419	0.18%	1.39%
UT	264,663,369	227,501,512	190,401,286	164,202,446	148,254,680	0.56%	4.44%
WY	1,537,216,372	1,438,798,196	1,402,608,212	1,402,654,935	1,255,059,059	3.97%	31.38%
Onshore	107,790,704	96,272,937	96,818,377	90,803,086	98,688,229	0.28%	2.19%
Offshore	1,354,149,051	1,256,774,957	1,111,100,538	1,020,510,066	1,058,788,351	3.28%	25.87%

1 Federal gas accounts for 12.7% of all U.S. production (including offshore) on a 5-year annual average basis.

2 Onshore alone accounts for 9.4% of all U.S. gas production on a 5-year annual average basis.

**Table 5 Oil Production Trends (bbl.)**

Region	2015	2016	2017	2018	2019	% Total	% Federal
U.S. Total	3447970000	3239657000	3420545000	4001892000	4470528000	100%	NA
AK	958054	805788	993799	1033904	1280423	0.03%	0.12%
CA	13421932	11013188	9795602	9504080	9292324	0.29%	1.26%
CO	5028374	4362350	5194434	6822327	6992221	0.15%	0.68%
MT	3294381	3028077	2859730	3368258	3180317	0.08%	0.37%
NM	79464456	76824847	89069273	129250843	167802210	2.92%	12.90%
ND	26666226	25855361	31143984	38720115	44509644	0.90%	3.97%
UT	11463564	9337508	9160104	8155747	7966094	0.25%	1.10%
WY	44402275	37716663	39030469	43960807	48404660	1.15%	5.08%
Onshore	2782516	2690002	2462480	2207843	2331383	0.07%	0.30%
Offshore	565024682	592505843	619871829	647366375	695553235	16.79%	74.22%

1 Federal petroleum accounts for 22.6% of all U.S. production on a 5-year annual average basis.

2 Onshore alone accounts for 5.8% of all U.S. petroleum production on a 5-year annual average basis.

Report year (2019) emissions for the production data disclosed above are shown in Table 8. The table shows indirect combustion (Comb) emissions of carbon dioxide and carbon dioxide equivalents, direct emissions of life-cycle-assessment (LCA) methane (CH<sub>4</sub>), direct LCA emissions from extraction (Extract), indirect LCA emissions from transportation and distribution (Trans), and indirect LCA emissions from processing, refinement, and transformation (Process). The Total CO<sub>2</sub>e column is the sum of the combustion CO<sub>2</sub>e and LCA CH<sub>4</sub> (as CO<sub>2</sub>e) columns, and is the metric used for impacts assessments later in the report.

**Table 6 Base Year Regional and National Federal GHG Emissions**

Region	Comb CO <sub>2</sub>	Comb CO <sub>2</sub> e	LCA CH <sub>4</sub>	Extract CO <sub>2</sub> e	Trans CO <sub>2</sub> e	Process CO <sub>2</sub> e	Total CO <sub>2</sub> e
U.S. Total	5772.48	5826.5	16.4415	1060.19	315.72	370.42	6418.4
CO	63.22	63.5	0.112	11.75	4.47	2.65	67.54
NM	138.25	138.7	0.2872	26.47	8.44	12.22	149.04
UT	41.26	41.56	0.0425	6.65	1.18	0.92	43.09
WY	656.74	662.23	0.5043	100.33	11.42	6.81	680.39

Other Onshore	7.64	7.66	0.0165	1.51	0.66	0.46	8.25
Offshore	358.14	359.48	0.7073	66.23	13.7	39.34	384.94

1 Comb CO<sub>2</sub>e includes combustion related emissions of CH<sub>4</sub> and N<sub>2</sub>O as CO<sub>2</sub>e using AR5 GWPs values.

2 Federal emissions are approximately 22% of the U.S. Total shown (16% for onshore only).

3 WY alone accounts for nearly half of all federal emissions, which is largely driven by coal (86%).

### Fossil Fuel Emissions Projections

The AEO projections for energy production across the nation is used to project forward the 5-year average trends for federal production and emissions outlined above. The major assumption of this scenario being that the ratio of federal and non-federal mineral production is fixed relative to the 5-year average going forward. The AEO explores a number of different energy projection scenarios out to year 2050 based on varying assumptions about the economy, technology, and policy. The reference case is the baseline scenario which is used in the EA for the evaluation of emissions from other Federal leasing actions in the region and nation. The reference case examines a future where slower growth in consumption (energy efficiency increases in the U.S. economy) is contrasted with an increasing energy supply due to technological progress in renewable energy, oil, and natural gas. The combination of the federal trend data and AEO scenarios provide for a longer term reasonably foreseeable range of potential emissions given the known parameters (supply, demand, policy, technology, etc.) that exist today and potential alternative policies that would change the evolution of energy dynamics going forward. Since these emissions estimates project forward from 5-year average instead similar well and production data used in **Error! Reference source not found.**, the Federal emissions for Utah are also provides using the 5-year average to allow for a direct comparison to regional and national emissions.

Projected total federal emissions of direct and indirect GHGs (as CO<sub>2</sub>e) for the AEO reference scenario and region are presented in Table 7.

**Table 7 Aggregate of Foreseeable Federal Fossil Fuel GHG emissions from 2020 to 2050**

State	Coal	Gas	Oil	Total	Utah % of	O&G Utah %
<b>Utah</b>	607.78	418.50	179.93	1,206.21	100%	100%
<b>Wyoming</b>	13,515.11	2,958.82	832.85	17,306.78	7.0%	15.8%
<b>Colorado</b>	594.75	1,361.58	110.92	2,067.25	58.3%	40.6%
<b>New Mexico</b>	242.09	1,831.00	2,115.42	4,188.51	28.8%	15.2%
<b>Regional Total</b>	14,959.73	6,569.90	3,239.12	24,768.75	4.9%	6.1%
<b>National</b>	16,062.84	6,991.07	4,226.73	27,280.64	4.4%	2.8%